The Builder.

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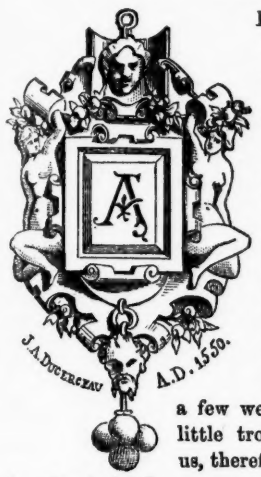
Going Along.
Paris: Strasburg.



ALL know nowadays that travelling is a comparatively easy matter, that railways have removed crookednesses, and that very much may be seen in a short time. Still, sitting at home and viewing far-off places through the old traditional medium, many scarcely realize what *can* be done in a few weeks, and with what little trouble. It occurs to us, therefore, that it may not be useless to jot down some notes of a recent rapid (though not hasty) tour, which ran thus,—Paris, Strasburg, Carlsruhe, Munich, Linz, the Danube, Vienna, Salzburg, Innsbruck, the Alps, Botzen, Verona, Venice, Vicenza, Milan, the Italian Lakes, Turin, Geneva, Macon, and so home again by Paris first-named. It occupied six weeks, including three or four days for the new buildings in the last-mentioned city, and the fresh collections in the Louvre,—that wonderful storehouse of things beautiful. An esteemed professor of our art was not far wrong when, being asked a few days ago, by one who was going to Paris for the first time and had but a week to spare, how best to employ it, he said,—"Exhaust the Louvre." "Beware of the man of one book" is an old maxim for the disputatious; the man of one museum, that museum being the Louvre, would be a still stiffer opponent. However, the exhausting process is not our present purpose, as will be seen from what we have already said. It will be readily understood that we do not advise such rapid travelling as that here described to those who can give more time to it, and return on their footsteps again and again. The object we have in view is to show those who have but little time to spare how much they may nevertheless see in it. To our younger readers, led to undertake such a trip or part of it, we would first say, as we have said before, take plenty of maps, guide-books, and sketching materials. Draw, draw, draw; and omit not to keep a diary. Remember, too, as Bacon hath it, that "he that travelleth into a country before he hath some entrance into the language, goeth to school and not to travel." At the same time we must observe, the fact of ignorance of foreign languages should not keep people at home. This would be simply making bad worse. With a smattering of French, or even without it, any one can now get along easily and still with profit.

The road we take is a hackneyed one, well known to many of our readers and thoroughly described in Murray's excellent handbooks. To others, however, it is unknown; and as we shall but touch it here and there, our notes may serve to refresh the memory of the first while they may excite the attention of the second, and certainly will not be long enough to tire either. We may hope to hit a new point or two, and shall bring in some illustrations of recent works. The South-Eastern Railway Company take us to Paris by way of Folkestone, Boulogne, and the *Chemin de Fer du Nord*, past the fine cathedrals of Abbeville and Amiens, and the towns of Clermont, Creil, and Pontoise. Between these three last-mentioned places the traveller for the first time is surprised by the number of churches that appear, the towers of which are gabled, and have a saddle-back roof. Some of these are of the twelfth century, and deserve study. Mr. R. J. Johnson, in his valuable "Specimens of Early French Architecture," has illustrated one close to Creil. Nearing Paris, say at Enghien, the great change which is taking place in the mind of the Frenchman touching a residence becomes observable. Cottages, "villas," and other residences for one family only, have been erected in all directions; and this is everywhere to be seen around Paris.

The new Paris Station of the Northern Railway, by which we arrive, is approaching completion. The front, of stone, is large, handsome, and appropriate, and shows the hand of an accomplished architect—M. Hittorff. His son has superintended the erection. The central archway has an elevation of about 100 feet, and is surmounted by a statue symbolizing the City of Paris. Besides this there are twenty or thirty other life-size figures representing cities, exceedingly well executed. We must do more in this way in England than we have yet done, thanks to the parsimony of employers and the state of public opinion on the subject. Without sculpture, life and character in a building are scarcely obtainable. Have we even yet the men in any number (willing so to work) capable of executing efficiently sculpture for architectural purposes? Paris is fortunate in having a good stone near at hand, an atmosphere not charged with coal-smoke, plenty of artist-workmen, and a right feeling as to the desirability of employing them. We have said lately so much of Paris, so much of the remarkable changes effected in it under the inspiration of the Emperor, that we shall now not stop there very long, but may touch it again in returning, and illustrate a few fresh features. Something, however, we must at once say.

The new collections at the Louvre, under the title of "Musée Napoléon III.," include antique sculptures, vases, majolica ware and other *faïences*, some rare glass, jewelled cups, early metal-work, Limoges enamels of wonderful beauty, and 303 pictures ranging from the time of Cimabue to that of Carlo Dolci, being a selection from the Campana Collection. The Gallery of Apollo, which contains some of the best of the glass and enamels, has been decorated quite recently, indeed is not yet finished, with a series of portraits, down to the knee, of architects and sculptors, very well executed, and very flattering to art. There are here an eleventh century metal shrine with figures, and two of the best pieces of Limoges work, signed "Lionard Limosin, 1553" (and well known), that are to be found. These consist each of a large centrepiece, with smaller pieces surrounding it. The centre of one, the finest, represents the Ascension, inscribed, *Donec totum impleat orbem*. In a lower compartment kneels Francis I., and as Henry II. was then reigning, we find the interlaced H. and two D.s amongst the ornamentation. The centre compartment of the other piece represents the Crucifixion.

Lionard was formerly considered the founder of the school, but it has been made clear that Limoges has been in the constant and uninterrupted possession of the art of enamelling from the eleventh century. He was, however, the head director of the royal manufactory of enamels founded at Limoges by Francis I., who bestowed on him, says Labarte, with the name of Limousin, to distinguish him from Leonardo da Vinci, the title of "*Peintre émailleur, valet de chambre du roi.*" This story is doubtful; but let it pass. The works of Lionard (or Léonard) range from 1532 to 1574. Those of which we have been speaking, two of his finest, were painted by order of Henry II., for the Sainte Chapelle. In the same gallery there is another well-known work in Limoges enamel, an oval dish, signed "Suzanne Court," usually considered one of the family of Courteys or Courtois, whose fine works in the Hôtel Cluny will be remembered by those who interest themselves in such matters. A little examination, however, leads to the belief that the Courts were a separate family of enamellers. There is another of her works in the museum of the Sèvres establishment, signed in a precisely similar manner, "Suzanne Court." There are some very fine specimens of Palissy ware and engraved glass in the Musée Napoléon III., and a bronze winged helmet of Roman times, or more probably Gaulish, which would gladden the heart of Rouge Croix Planché.

Of the quaint and rare "Henry II. ware" there are eight pieces, namely, four salt-cellars, two cups, a small kettle-shaped vessel with crucifix in front, and a cover of a cup not there. None of them equal in size or beauty some of the specimens exhibited last year in the Loan Court of the South Kensington Museum.* Nor must we omit to mention the illuminated "Hours" of the Emperor Charlemagne, A.D. 780; the metal, curule, chair still marked as that of Dagobert, A.D. 628, but which looks to be part earlier and part later, though none of it is more modern than the tenth century; and the grand Ivory Retable de Poissy, which is about 7 feet wide, 7 feet high, and displays seven ranges of carved figures, illustrating the life and passion of the Saviour, with three canopies at top, besides niches and figures at the bottom. If we recollect rightly, but we made no note at the time, it is a work of the fifteenth century.

Touching the pictures, with a diffidence to be commended, though the result is not satisfactory, M. F. Reiset, who has arranged them, and prepared a catalogue under direction of the Count de Nieuwerkerke, has named the painter of but few of them, contenting himself with classing them in schools. Thus, under the head of "School of Giotto" (Giotto died A.D. 1336), he places a remarkable St. Christopher bearing the infant Jesus. The child carries a globe, on which may be read "Asia, Africa, Uropia." A series of scenes from the Life of our Lord on nine panels, enclosed in three frames, is a very noticeable work of the same period. The earnestness and sentiment depicted in the heads give these early pictures a remarkable character. We might point also to the Annunciation, attributed to Agnolo Gaddi, painter and architect, son of the best of Giotto's pupils, and who died at the end of the fourteenth century; and to works by Lorenzo Veneziano (dated 1372), and Stefano Veneziano (dated 1353). In a picture of the School of Sienna,—commencement of the fifteenth century, wherein the Virgin is represented standing, holding the Infant Christ, and having under her mantle a crowd of persons of all conditions,—the heads of the latter display remarkable delicacy and beauty. In the foreground of the picture a number of penitents are administering flagellation to themselves, a portion of the dress of each being removed to show, curiously, the wounded back. A predella of five parts, illustrating the Life of St. Jerome, by Ansano, or Sano di Pietro, who died in Sienna in 1481, justifies the high opinion of a late editor of Vasari, who places Ansano amongst the most celebrated miniaturists. Vasari himself has not spoken of him. His works before us show great purity and elevation of thought. There is a Portrait of a Man dressed in black, and wearing a black cap, signed *F. Francia Avrifex Bononiæ*, and although we agree with M. Reiset that this writing is a forgery, and believe that the picture has been rehandled, it is a striking and charming work. We may not attempt, however, to point to all that interested us, but must get out into the air again. In due time some of the pictures now hung will be turned out and others will be rightly named.

The square and octagon Gothic tower (something like the upper part of the tower of St. Dunstan's-in-the-West), erected at the east end of the Louvre to tie into a whole the new mairie of the arrondissement and the restored ancient church of St. Germain l'Auxerrois, is not successful.

* At the Hôtel Cluny, by the way, there is one piece of this ware, a sugar-dish with cover.

The details and carving are as bad as need be. The mairie, while it is made to match in mass and outline with the old Gothic church, with rose window, parapet, and gable, is of the Renaissance style in its details. A very large church, also in the style of the Renaissance, is being erected, and has made considerable progress, in the Rue St. Lazare. This stands at a point formed by the meeting of two streets, opening into the Rue St. Lazare, and serves to terminate the Rue de la Chaussée d'Antin. The greatest care, wisely, has always been taken in the French capital to place public buildings at the end of vistas; where, while they may be well seen, they aid the general effect. A new building for the Tribunal of Commerce and Prud'hommes is rising on the quay, not far from Notre Dame. It has a dome of peculiar and not pleasing shape. The exterior being at present wholly *en bloc*, it would be unfair to judge of its ultimate appearance. Various statues, of which we hear good things, are to form part of the main façade. The river front of the Tuileries is being completed; and two more new streets are being opened. One improvement struck us as much needed, and that is the removal of the ugly hospital, or Hôtel Dieu, next the river, which shrouds and damages Notre Dame, now restored. And, while suggesting, we would point to the English Protestant Church in the Allée Marbeuf of the Champs Elysées, as a positive disgrace to our faith and country. Would not an effort obtain means, without much difficulty, to erect a better building? The manner in which the services have been performed here lately is not very satisfactory; and we might ask why, with necessarily a fluctuating congregation, a private hymn-book,—of which, moreover, the second edition differs from the first,—is substituted for the psalms and hymns of the Prayer-book in every one's hand? The places used for Protestant worship in other countries besides France are discreditable and damaging, as we may take occasions to show.

The Chapel of St. Ferdinand, a *Chapelle Ardente*, erected on the other side of the Champs Elysées, on the spot where Louis Philippe's eldest son, Ferdinand Philippe, Duke of Orleans, died after a fall from his horse, in 1842, is externally a poor mean thing. Within, it is less unsatisfactory, and that is as much as can be said. The style followed is Byzantine. It contains a recumbent marble statue of the duke, by M. Triqueti, with an angel at the head by the Princess Mary of Orleans; stained glass in the windows, executed at Sèvres, from the designs of Ingres and others; and a large portrait-picture of the Prince's last moments, his family and the ministers standing around. Farther on, towards the Bois de Boulogne (one of the best monuments of the Emperor Louis Napoleon's reign) is the Russian Church, lately completed, of which our readers have heard more than once. This, too, is Byzantine in style, but a work of very different character; though here, also, the exterior, with its domes, Russian crosses, and porch, is less satisfactory than the interior. The porch, which has a trefoil arch on each side, and one in front, all springing from one slight column at each angle, is coming to pieces, and may need what the older architects often introduced at first, a horizontal bar at the springing. "The arch never sleeps." The interior of the church, a Greek cross in plan, is painted and gilt from top to bottom by Messrs. Sarroquin, Vassillieff, & Bronikoff, all Russian artists. The cherubim in the spandrils of main arches, and the red winged figures around the Saviour in the centre cupola, are ugly and disagreeable. The Iconostasis is adorned with painted figures on a gold ground, which, from the distance at which alone visitors are allowed to view them, appear to be good works; and the effect of the whole interior is certainly harmonious and pleasing.

The building for the Permanent Exhibition, at a short distance from Auteuil, about two miles out of Paris on the road to Sèvres, and of which illustrations have been given in the *Builder*, is being fast proceeded with. The columns, girders, and external stone walls for the lower story are up all round, and parts are much more advanced. Thus the principal entrance is up to the extent of perhaps 45 feet, and one end of the building is roofed in. Two travelling scaffolds on a railway, founded on those which were contrived for the construction of our International Exhibition building at South Kensington, are in use. The iron work is strong, almost to the extent of clumsiness; but this appearance will be lessened by the painting and decoration which are to come. The floor of the galleries is formed with concrete on girders. The dome, as our readers know, is to rise to a height of 345 feet, and the building will present a clear space 1,050 feet long, and 130 feet wide, and be 110 feet in height to the crown of the semi-circular roof. Omnibuses running on rails all the day make the building less than half an hour off from the brilliant Place de la Concorde.

One note more, and that a small one, though with practical bearing, and we leave for the present magnificent Paris,—Paris which has now the finest set of streets in the world; and yet presents in parts houses arranged as if for the purpose of injuring health and shortening life; dens overcrowded from roof to foundation, producing fevers which are not to be limited to where they are first fostered. The note applies to the beauty of the writing in the streets, in the large majority of cases, on shop-fronts and other establishments; especially as contrasted with the coarseness and ugliness of that to be seen in London. The *Cinque-cento* writings of Italy appear to have afforded the principal types. Remembering the ugly letters used in the streets of Paris ten or fifteen years ago, the improvement is even more striking. The same excellence in this respect is now to be observed in Austria and Italy.

A run to St. Denis showed us that the Government are wiping out the blots that were made in the cathedral by a previous Government. Money was spent to spoil, and now money is being spent to get rid of the effects of the first expenditure. The sham Royal Mausoleum, as the crypt was termed, is shut up; the modern glass, mostly very bad, is to give place to better; the monuments are being re-arranged, and, under M. Viollet le Duc, the east end, shut off by partitions, is undergoing complete repair and restoration, and has received a new high altar of his design. The effect of the exquisite triforium of the nave, open to the light, is entirely destroyed by the stained glass now in it, which mars its lines and prevents it from being properly seen. The thirteenth century glass at the west end; two carved capitals ascribed to the eighth century, now in a chapel on the north side; a fine sixteenth century carved wood altar-piece, illustrative of the life of Christ; the excellent fourteenth century (?) sculpture in the chapel of St. Philip; and a singularly large and perfect incised memorial slab, should not be overlooked.

A long day on the rail; past Meaux, where the cathedral is suffering restoration; Chalons, Vitry, Bar le Duc, Toul, and Nancy; brings us to *Strasburg*. On the road, more of the towers with saddle-back roofs are seen, and fresh signs of the life which is everywhere evident in France,—new residences, mills, and churches. It was night when we reached Strasburg, and the first thing done was to run to the Cathedral, with the hope of a moonlight effect; nor was the hope unfulfilled. Dark at first, we were soon able to say with Croly:—

> "How like a queen comes forth the lovely moon
> From the slow opening curtains of the clouds;
> Walking in beauty to her midnight throne!"

Spire and open staircases, pinnacle and parapet, are gradually lighted up; quietly spreads the mild radiance; and soon the whole of the glorious structure shines in splendour; the crowning cross lost amongst the stars. Such a sight becomes thenceafter a piece of one's life, and never departs.

THE TUNNEL THROUGH THE ALPS.

THIS extraordinary and gigantic work was sanctioned by the Sardinian Government, on the 15th April, 1857, for the purpose of effecting direct railway communication between the kingdoms of France and Italy. It is, therefore, an international work of great importance; and from the nature of the project, and difficulties to be overcome, it has attracted a large and increasing amount of interest throughout the length and breadth of Europe. Historians of the classic age gravely tell us that Hannibal forced a passage through the Alps, for himself, army, and elephants, by the simple process of dissolving them with vinegar. It is much to be regretted that modern engineers cannot adopt the process of Hannibal, at once so simple, short, and sublime. He must have had better chemists, or, at least, stronger vinegar, than we possess at the present time. Cannot this wonderful vinegar be rediscovered by some of the learned members of the British Association for the Advancement of Science, or by some of the erudite academicians of Paris or Turin, who are so deeply interested in the cutting of this tunnel? Hannibal's famous vinegar, however, like the Greek fire, perpetual motion, the black broth of Sparta, and the philosopher's stone, stands a poor chance of being rediscovered, unless it should be stumbled upon, as usual, among some of the musty records so carefully treasured up in the flowery land of China. "*Mais, mes amis, revenons à nos moutons.*"

At present there is a grand break in the railway system connecting France and Italy, this break being occasioned by no less an obstruction than the snowy Alps. Mont Cenis blocks the way.

To pierce a passage through these Alps is the object of this tunnel now in process of execution. The line from Genoa and Turin at present stops at Susa, and that from Lyons at St. Michel, Mont Cenis intervening its lofty head.

The northern entrance of the tunnel is near the little hamlet of Fourneau, and less than half a mile from the small town of Modane, the latter place being the last scene of Sterne's "Sentimental Journey;" and not a long way farther up the same valley Horace Walpole lost his favourite lapdog, through the agency of a hungry wolf, who rushed from the rocks and gobbled him up, much to the grief of that nervous little gentleman. The southern end is in a deep valley at Bardonnèche, on the Italian side of the Alps.

The entrance to the tunnel on the side of France is 1202·82 metres above the level of the sea, and its termination on the Italian side 1335·38; so that the actual difference of level between the two extremities of the tunnel is 132·56 mètres, or about 435 feet, the Italian end being this much the highest. There are two gradients in the tunnel, which divide it nearly in two equal lengths, the ascending gradient from the side of France rising to 135·63 mètres, from which point it gradually falls to the opposite end, on the side of Italy, to the amount of only 3·05 mètres, or about 10·072 English feet, in a length of nearly $3\frac{3}{4}$ miles; so that for this latter distance it may be considered as being practically level.

The rising gradient ascends to the middle of the tunnel at the rate of 20·22 mètres in 1,000, or 1 in 45 according to the English mode of expressing the value of gradients. The descending one falls at the rate of 0·50 mètre in 1,000, which is equivalent to 1 in 2,000; so that one half of the tunnel has a tolerably stiff gradient, and the other quite easy; but for such an Alpine country the 1 in 45 is much better than might have been expected under the circumstances. This is, however, sufficiently heavy, when it is borne in mind that the whole of the railway traffic between France and Italy will have to traverse the tunnel.

It was, of course, necessary to prepare accurate plans and sections, to determine the levels, fix the axis of the tunnel, and set it out on the mountain top; to erect observatories and guiding signals, solid, substantial, and true. The mountains had to be surveyed and triangulated, bases measured, and the exact length and levels of the tunnel determined with the greatest care and accuracy; for errors in the angles and reduced calculations would have led to the most disastrous consequences in a tunnel of this enormous length.

The difficulty of tracing the axis and setting out a corresponding line over the summit of an Alpine range, over rocks, ravines, and precipices; of continually climbing, ascending, and descending the immense heights, from point to point and from station to station, will be readily appreciated by those accustomed to ramble among lofty mountain ranges.

Great as the labour and difficulty of climbing and scaling these rugged heights may have been, they were as nothing compared to the engineering difficulties created by the inclemencies of the weather. These were the greatest stumbling-blocks of all, from the impossibility of continuous work with levels and theodolites in such a wild and exposed place. The engineers were exposed to all the tempests common to these Alpine regions,—rain, mist, sleet, drifting snow, and their more troublesome and ever constant enemy, the howling wind, ever constant in its wild and fierce inconstancy.

It was impossible to work with delicate instruments when exposed to storms and hurricanes at these lofty elevations; hence it frequently happened for days together that not a single observation or an angle could be taken.

All this involved the daily necessity of climbing and scrambling among pathless rocks, from 800 to 1,000 mètres in height, to embrace any favourable opportunity or lull in the storms which might occur, and snatch an observation, an angle, or run a level, when a lucky chance presented itself. They had to watch opportunity, and be ready for every occasion.

However, after a long, laborious, and patient work, this all-important and interesting triangulation, with all its troublesome details, was brought to a happy issue and triumphant conclusion; the final direction and exact length of the axis of the tunnel accurately determined; all the observations and signals firmly fixed in their true positions;—worthy monuments of high skill and patient perseverance under difficulties and embarrassments of no ordinary kind.

The total length of the tunnel was determined to be 12,220 mètres, or about *seven miles, four furlongs, and one hundred and sixty-four yards;* and notwithstanding all the difficulties of the various operations, and ceaseless hinderances; in spite of Alpine seasons, so accurately was the triangulation executed, that the maximum deviation from exactitude was confined within the limit of 11·417 inches in the whole distance of 7½ miles, or about 1½ inch per mile, which, of course, can have no practical effect in a work of this magnitude: a great and distinguished proof of the energy and ability of the Italian engineers employed in this delicate and critical operation.

The mountain through which the tunnel is to be pierced is exceedingly rough and irregular in outline, and, as might have been expected, very steep and rugged, being, in fact, a true Alp.

The lowest point is at Fourneau, close by the main route over Mont Cenis. From this valley, which is at an elevation of 1,096 mètres above the level of the sea, the mountain ascends rapidly 106 mètres, to the northern entrance to the tunnel, which is in a picturesque gorge in the valley. It then rises rapidly 348 mètres more, to Les Aysards, a cluster of chalets in the slope of the mountain, where is placed the first signal-station. The line then runs along the rugged slopes, and rises a further height of 102 mètres, immediately after which it drops down to the ravine in which rushes the Torrente del gran Vallon. After crossing this impetuous stream, it rapidly ascends a height of 741 mètres, till it reaches the station La Riond with a further ascent of 221 mètres. From this latter point it skirts the shattered slopes of a steep precipice to the Vallonet station with a rise of 306 mètres. The line then crosses the apex of the rocks, and at once rushes precipitously up to the Observatory, on the pinnacle-like summit, with a further rise of 75 mètres, this summit being 9,675 feet above the level of the sea, and 5,714 feet above the tunnel mouth at Fourneau. From this point the mountain descends with great rapidity over exceedingly rugged and broken ground, no less than 1,094 mètres at one swoop to the torrent of the Merdovine, which flows down a deep valley. It once more rises 116 mètres, passing a wild and broken country, to the apex of a precipice at the Banda station, from which it again falls with a rapid drop of 457 mètres, to the southern mouth of the tunnel at Bardonnèche, close to the torrent of the Rochemolles.

The heights of some of the Alpine peaks in the immediate neighbourhood of the course of the axis of the tunnel, reach the following elevations, expressed in English feet:—

	Feet.
Mont Rond	8,057
Mont Pelouse	10,384
Punta di Frejus	9,761
Bellcoll	7,886
Chabrière	7,358

So that the summit of the highest Alp, Mont Pelouse, near the line of tunnel, is 10,393 feet above the level of the sea, being thus considerably above the limit of perpetual snow, and nearly twice the height of the great road over Mont Cenis.

The various sectional heights of the axis of the tunnel, as traced along the summit of the mountain, and of the various signal stations, placed along the course of the line, may be briefly tabulated as under; commencing from the north or French side, and passing over the summit to the Italian side, the heights being in mètres taken from the longitudinal section:—

0.	Entrance to the tunnel	1202·82
1.	Signal station on line	1550·04
2.	Ditto	1659·35
3.	Ditto	2847·51
4.	Ditto	2374·96
5.	Ditto	2375·66
6.	Ditto	2568·89
7.	Ditto	2574·03
8.	Ditto	2547.47
9.	Ditto	2874·68
10.	Ditto	2874·94
11.	The summit	2949·16
12.	Signal station	2426·66
13.	Ditto	1971·98
14.	Ditto	1959·86
15.	Ditto	1792·55
16.	Exit of tunnel, Bardonnèche	1335·58

Besides these signal stations and observatories, there are others on the mountains facing the entrance of the tunnel, three on the French and two on the Italian side, all being well-built structures of great solidity.

The highest summit of the mountain under which the tunnel passes is 9675·71 English feet above the sea level.

The preparatory works were of vast magnitude, including the construction of new and solid roads, of vaulted canals, bridges, magazines, offices, workshops, forges, furnaces, and machinery driven by a turbine of 12-horse power; extensive reservoirs,—some underground, to shelter them from the frost, high up on the mountain side; residences for the men, offices for engineers; being in fact a complete and perfect establishment of great extent and variety of detail, both at Bardonnèche, Modane, and Fourneau.

As the excavation of the tunnel was not to be effected by manual labour,—nor indeed by steam,—other means had to be adopted, and new machinery devised for the purpose. The power of water,—so plentifully supplied by the Alpine snow and rain, was the great motive power determined upon, as being the most economical and manageable for such a mountainous locality: hence new hydraulic and pneumatic machinery had to be invented, tested, varied, and improved. Water was the generating power, but the perforating machinery was to be driven by the action of *compressed air,*—the *modus operandi* of which had to be determined, and put to the test of actual work and experiment, on a grand scale, before the real labour of the excavation began.

Besides driving the perforating tools, the same air had to ventilate the tunnel, and keep it in a fit state for respiration; for it will be seen, that a tunnel *without shafts,* more than 7½ miles long, could not be ventilated by the ordinary method usually employed for such purposes.

Passengers traversing Mont Cenis pass through the little Alpine town of Modane, where are numerous works, connected with the tunnel; and also the hamlet of Fourneau, where again are seen extensive establishments of an appearance and character little dreamt of by travellers in a wild and romantic pass like this. The mass of pipes and tubes for air and water look quite bewildering—looming like the apparatus of some Titanic distillery.

It seems incredible to the passing stranger that this pile of pipes, tubes, tanks, and reservoirs, are employed for the purpose of boring into the bowels of an Alpine mountain, of hard and solid rock, without the aid of steam, and little help from manual labour. Black mail is levied on wind and water,—arrested in their course, they are compelled to work their passage; seized upon by engineers, and reduced to subjection, they are imprisoned in iron pipes and tubes, and only liberated to go where they list, after performing their allotted labour.

Although in June, 1858, and September, 1859, arrangements were made for procuring the necessary materials for compressing the air, and for the perforating machinery, it was not till November, 1860, that five of the machines were really erected and put to work at the tunnel at Bardonnèche.

A novel machine for perforating hard rock was not easily brought to perfection; it required a long and elaborate series of practical working experiments, and numerous modifications in detail, before being considered fit for the real work it had to do.

It required to be of sufficient power to do the work with ease and precision, to be of such size and weight as to be easily managed by one or two men, and so strong and simple in form and construction as to avoid the necessity of frequent stoppage and repair; for the work such a machine was required to do should be continuous night and day as far as possible.

It appears from the report of the engineers, that the time the machines were actually at work during the year 1861 at Bardonnèche, was only 209 clear days, with an actual advance of the whole front of the excavation of 170·54 mètres, which only gives a daily progress of 0·81 mètres.

At the same place during 1862, there appears to have been 325 full working days, with an actual advance of the tunnel of 380 mètres, which gives for the daily working progress of the complete tunnel 1·17 mètres. At the northern end of the tunnel at Modane for the same year, 1862, the advance is stated to have been at the rate of one mètre per diem.

Since 380 mètres were actually advanced in 325 days at Bardonnèche, this will give for the entire year, if in full operation at the same rate, an advance of 462 mètres, and if we add the 365 mètres for the progress at Modane during the same period, the total progress forward at both ends for an entire year will be 827 mètres,—so that at this rate of working it will require 14¾ years to complete the excavation, and, taking all the circumstances of the case into consideration, it is doubtful if the tunnel can be bored through in a less period of time.

The total estimated quantity of rock to be excavated is 600,000 cubic mètres, or about 784,666 cubic yards. As the tunnel is 13,354 yards long, this will give for the lineal yard forward, and for the whole face of the tunnel to be removed, nearly 58 cubic yards. At the average advance of 1·17 mètres per day as above stated, this will give a daily removal of 73½ yards cube; and if both faces are worked at the same progressive rate, it will yield 147 cubic yards of daily excavation for the joint work of all the boring machines in operation.

This supposes continuous working, which, however, is scarcely possible, for there is always time required to charge the bore holes, fire the blast, break down the shattered rock, and remove the whole of the loosened material out of the tunnel.

There will also be a sensible loss of time occasioned by prolonging the pipes and tubes for the compressed air, to work the machines, for the water and gas pipes; for all these must keep pace with, and follow up the advance of the perforating machines in the tunnel, as well as the timbers and rails for carrying the machines, and other indispensable work of the kind, all of which must advance simultaneously.

The rock in which the excavation is at present being made is of a quality exceedingly difficult to work, having what the engineers have called an "infelicitous stratification," with great diversity of texture, which has proved very trying to the perforators. The rock is a crystallised calcareous schist, very much broken and contorted; being interspered in almost every direction with large masses of pure quartz, in veins of variable dimensions, straggling irregularly through the general body of the rock.

It has proved difficult to work in a diversified material of this character from the unequal resistance presented to the perforators by the calcareous schist and quartz, it not unfrequently happening that the chisels have to be turned from their proper direction, through meeting with a block of quartz, which of course leads to loss of time.

The production of compressed air at Bardonnèche for the year 1862 amounted to 117,000 mètres cube per month, with an actual pressure of six atmospheres; the entire year giving the immense amount of 1,404,000 cubic mètres; which is equivalent to a volume of air at its ordinary pressure of 8,424,000 mètres cube, or 11,024,000 cubic yards English.

It was ascertained by experiment that each perforator working at its ordinary rate consumed three litres of compressed air per second, so that the nine machines expended 27 litres per second, which is at the rate of 97 mètres cube per hour, equal to a consumption of about 3,425 cubic feet English, of air, compressed to a pressure of six atmospheres, or in round numbers, with a working force of 90lb. per square inch of surface.

When the air so compressed to six atmospheres is liberated in the tunnel, and expands to its normal state of pressure, it is found to absorb nearly the same quantity of heat which it gave out in the act of compression. By this absorption of heat from the air in the tunnel, the temperature which has been heated by the workmen, the lamps, and gas, is considerably lowered, thus ren-

dering it more cool, fresh, and suitable for respiration.

At Bardonnèche, during the 325 useful working days, the number of holes bored to a depth from 0·75 to 0·80 mètres amounted to the number of 45,751; the number of chisels employed was 72,538; the gunpowder consumed weighed 40,735 lb.; and the length of match for firing the mines amounted to 76,510 mètres.

In 1861 the machines advanced the tunnel 170 mètres, by boring 20,000 holes; in 1862 they bored 46,000, besides 6,000 made during the working experiments; amounting altogether to 72,000 holes, divided amongst 80 perforators: from this it results as a mean, that 900 holes were drilled by each of the perforators.

The eight machines worked ten perforators, and made 80 holes in 7 hours 39 minutes, so that each machine took 7 hours 39 minutes to bore 10 holes, or three quarters of an hour for each mine hole. In three quarters of an hour each machine worked at the rate of 3 blows per second, making 8,100 evolutions complete, thus giving 8,100 blows of the chisel to execute one hole. The 900 holes bored on an average as above stated, gives for each perforator 8,100 × 900 = 7,290,000 blows, worked by air with a percussive force of 90 kilogrammes, or about 197 lb. for each blow.

By way of comparison of cost, it may be observed that the Bletchingly tunnel on the South-Eastern Railway, in blue clay, shale, and sand, cost at the rate of 71*l.* 18s. 7d. per yard forward; the Saltwood tunnel, on the same line, 118*l.*; the Kilsby tunnel, on the London and Birmingham, 125*l.*; and the Clay Cross, on the Midland Railway, 100*l.* per yard forward. The estimated cost of the *Mont Cenis* tunnel is stated to be within the limit of "*quattro mila lire al metro currente*," which will be at about the rate of 166*l.* per lineal yard: assuming this to be near the mark, the entire tunnel will cost at this rate, upwards of two millions sterling. One item of cost in this tunnel which must not be overlooked, is the heavy amount of transport, the length from the middle of the tunnel to either mouth being upwards of three miles and a half. The tunnel is for a double line of rails.

The wear and tear of the perforating machinery has been found greater than was expected; for the hard, sharp-cutting particles of dust from the drilled quartz and other rocks, causes constant and considerable damage to the machines. This will be readily imagined when the number of blows, pushes, and revolutions made by the boring tools are enumerated. To bore eight holes 2¾ feet deep in the rock, when of average working quality, the motory cylinder completes 57,600 revolutions; the striker, or driving piston, 57,600 blows, each with a percussive force of 90 kilos.; and the chisels make the same number of turns or twists; so that, to bore these holes to the above depth, a force of 11,347,200 lb. is expended, or 1,418,400 lb. for each hole; which will be quite sufficient to illustrate the cause of the wearing of the machines when exposed to quartz dust and effecting this amount of work.

As a matter of mere curiosity, to show the magnitude and extent of the various operations to be performed and labour required, it may be stated that, if the above rates of working should be maintained, the number of holes necessary to be bored to get through the whole tunnel will exceed 1,599,709. The total depth of all these holes, when bored, will amount to 1,279,767 lineal mètres, or 4,265,890 feet, which is 105 times longer than the entire length of tunnel to be excavated. The number of blows required to be struck by the perforators to do this work will reach the high figure of 12,957,642,900; while the total magnitude of all the percussive blows showered on the chisels will amount to no less than 2,551,957,651,300 lb. English; so that each cubic mètre of rock extracted will require a percussive power of 4,253,262 lb. to force it from its place, as applied at the head of the boring chisels, to bore the holes alone, to which must be added the explosive force of the gunpowder when the charged hole is fired.

It may be explained briefly, that the tunnel for its whole width of face is not attacked at once, a "gullet," or heading is driven considerably in advance of the completed work. This small gallery is rather more than 11 feet wide, and 7¾ feet high, and square in form. A line of rails is laid nearly the whole length of this gallery of usual gauge, to communicate with the line in the main tunnel; beside this there is a line of rails of lesser gauge for the small *trollies*, used to convey the broken rocks from the head of the gallery to the common trucks. In general the machines which attack the front of this heading, are armed with nine or ten perforators,—some acting directly in the face, others diverging to the right and left, and thus carry on the borings in the gullet, till all the holes are ready for their charge of powder. Thirty-seven men and boys are required to attend to the machines and other matters in connexion with them.

The work of the main tunnel follows up the small gallery, which is progressively widened to the extent and form required for the full section of the complete excavation. It has been estimated from data obtained by actual working of the machines, that the tunnel may possibly be excavated in fifteen years, but it appears that twenty years is the time calculated upon by the engineers engaged in the conduct of the work. The limit assigned for the completion of the tunnel in the convention agreed between the French and Italian Governments, is twenty-five years. It is, however, a work requiring time, money, and patience; it cannot be hurried, and must look to completion from steady and unremitting labour, day and night, without ceasing. It is a great and noble work, boldly and skilfully begun. Let us, therefore, indulge the pleasing hope that it will be brought to a satisfactory conclusion, and open a passage for the iron horse through the grand barrier of the Alps.

JOSEPH LOCKWOOD.

THE PRESENT REQUIREMENTS OF ARCHITECTURE IN ORDER TO A SUCCESSFUL COMPETITION WITH ANTIQUITY.*

AT the beginning of the present century, and for some time previous, our cathedrals, and the great works of antiquity, were placed amongst the "Seven Wonders," without a thought of any future rivalry. Now, however, such immense strides of art and engineering are made, that the time has arrived when it ill becomes us to strike our colours ignobly to a less tutored age. The institution of this and like societies having for its object the promotion of architecture, we have to expand the narrow views that are taken. Nor are we to yield to the feeble imputations of absurdity when we propose to emulate the successes of former times. Progress is the rule of life; and it behoves us, gigantic as the task may be, to strive to come up to, and to excel, those who as yet leave us so far behind.

To improve the system in the practical working, and to increase the encouragement, are the two points to be attended to. With this view it is important, in our efforts for the advancement of architecture, to inquire into the secret of its success when it most flourished: we therefore propose to consider the advantages of former periods, with suggestions for the recovering of them. We shall confine ourselves to the Gothic style; and intend to corroborate our remarks with criticisms upon some examples both ancient and modern. This latter part of our paper must form a sequel at a bi-monthly meeting, as time and circumstances forbid its being so extended on the present occasion. The ancient remains which we possess are chiefly ecclesiastical, and they show that an almost incredible amount of interest in the art was sustained for some five centuries; after which the interest subsided, and the indigenous style was abandoned for such as was more or less borrowed and wretchedly insipid in comparison. Now we ask, What was it that kept up this great architectural movement and secured so great success? And what past advantages, or equivalents, can we regain?

We will name for consideration five things, which we imagine mainly contributed:—1. The demand for cathedral and abbey and other churches of great splendour. 2. The fascination of Gothic design. 3. Seclusion allowing concentration of the architect's whole mind upon his work. 4. No more being carried out under one individual than could receive unlimited attention. 5. Collective help; valuable suggestions in design being accepted by the chief architect from ecclesiastics or others, including the trained body of free masons; and not rejected as officious; the religious and artistic object overriding every other interest. We venture to say it is not that our professional men are inferior in taste and skill to their forefathers: it is owing to a change in the system and patronage of art, that such prodigious fruits do not now appear; and it devolves upon us to make every effort to recover as much as is practicable of the facilities and helps which we have lost.

* By Mr. Vincent Wing, of Melton Mowbray. Read at meeting of the Northamptonshire Architectural Society.

1. As to ecclesiastical demand,—which we mention in the first place,—no doubt the feudal system, united with some conscientious feeling of duty on the part of the lords of the soil, was favourable to pecuniary supplies, whilst peculiarities in religious ceremonies and religious life rendered imposing edifices a matter of all-absorbing consideration; and we do not expect, nor do we wish for, a return of such times,—as one of our poets has it in an exquisite effusion on the ruins of Kendal Castle,"—

> "Times of rude faith, and ruder men—
> God grant they never may come again!"

But we hope to succeed without these auspices. A sense of what the houses of God ought to be in priority over the dwellings of men is all that is required, and that is reviving amongst us: instances are not entirely wanting, where the mansions, or superb "ceiled houses" as the lament of the prophet expresses it, are surpassed, as they should be, by the costly character of the temple. To this quarter—the church—it is not only right still to look, but we are compelled to do so; for it is not sufficient, in the higher interests of architecture, that secular public buildings and domestic structures be required: the church is infinitely the best sphere; and until the erection of magnificent and gorgeous ecclesiastical edifices comes again into vogue, encouragement to architecture cannot recover its full proportions. We know it will be said,—having as a nation done with monastic establishments and gorgeous ceremonial, the scope for such grandeur is gone. Still, we demur to the inference, and we aver that it is not idle to contend for, at least, the erection of cathedrals of great magnificence. This we must insist upon, much as the contrary impression may prevail; and we can do so on principle, as well as in the interest of art. We recommend to be read Mr. Beresford Hope's "Cathedral of the Nineteenth Century." The notion is erroneous that our Protestant ritual is so precise and simple that it forbids altogether imposing processions: the inspired sentiment of the Hebrew psalmist teaches better. Much less can it be said that our principles are so ultra-puritan that the "sublime and beautiful" of the cathedral are incompatible with Anglican worship. What man having taste united with his piety ever found it to be so? Who would not deplore the loss of those noble buildings which we possess? Who would condemn the efforts expended on the modern Cathedral of St. Paul? Who would not like to see the insufficient ones of Manchester and Oxford exchanged for better? or, with the demanded extension of the episcopate, a corresponding provision for the highest solemnities of our religion in the new dioceses? The procession and the large gathering at an ordination, at a visitation, or confirmation, or on any other great occasion, so much aided in effect by cathedral grandeur with its concomitant sublime tones of music, are not empty pomp pandering to a pseudo-religious feeling, but legitimately impress the mind and heart that the spiritual benefit may be the more lasting. Nor, independently of this, is vacant space in the cathedral a waste, as we hear it objected. The nave as a spacious avenue is most effective for solemnity: the house of God naturally symbolizes heaven, the dwelling-place of the Infinite; and is not necessarily a mere pale for a congregation. The influence of immensity is felt to be not a little potent, and that even in the ordinary services. Witness the confessions of those great men, Milton and Robert Hall, to which even their unecclesiastical spirits were constrained to give utterance. The former, referring to cathedral architecture with the "pealing organ," has the glowing lines,—

> "Dissolve me into ecstacies,
> And bring all heav'n before mine eyes."

And the latter remarked that "he could not enter York Minster without the sublimest and most devout imaginations pouring into his mind." Equally fallacious is the objection, that higher claims would have their support diverted. Our ideas may seem large to those who are not prepared for the demand we make; and they may be greatly distant from realization; but it is little more than a dream of despondency, arising out of the niggard spirit in honouring our Great Creator, that at present represses noble aspirations. England's elder university rests content with a provisional cathedral!—an interesting antiquity, but a priory fragment, and little better than a village church. Could we but stir up the people to it, and combine in a new one at Oxford the continental grandeur with the English superiorities—the high vault of Amiens, with the higher lantern, the spacious transept, and "the long-drawn aisle" of York,—it would produce a

consciousness of national advance and universal congratulation. Nor is there occasion for despair: individuals are found now whose offerings to church architecture amount to the hundred thousand; and, with the rapid increase of the country's wealth, it is but reasonable to bespeak this standing acknowledgment and honour to the Giver of our substance. Such becoming employment of the highest class of talent would go far to guarantee to architecture the culmination to be aimed at; for edifices of transcendant magnificence are necessarily very many years in hand, and their erection would furnish what the art most needs; namely, an enduring field for its highest cultivation. On the contrary, if cathedral building is to be passed off as visionary, it is equivalent to quitting in despair: the very sphere required being abandoned, antiquity will only mock the modern architect's attempt at rivalry. In the promotion of architecture, then, our views must be expanded in reference to the church: the church must not be left, as it is, in dwarfed proportions, but partake of the general progress. We ought no longer to allow the huge tavern to be looking down on the steeples of our churches. And we hesitate not to say,—If our attainments in the art are to equal those of the ancients, if we are to resuscitate its bygone splendour, and bequeath to far-off generations equal monuments of our times, magnificent cathedrals and churches must, as formerly, furnish the leading encouragement. To this then it behoves us to stir up the people. We have the superiority in wealth, in intelligence, in mechanical power, and in advantages generally, together with purer inducements; why are we not, in this chief sphere, as in others, aroused to surpass our less favoured predecessors?

2. The next thing we have to allude to is, the fascination experienced by those who designed the structures of the Middle Ages. The extreme pleasure afforded to them is seen unquestionably in the effects. And on this it is unnecessary to dwell; for we doubt not that it will be felt again in a similar degree, if the unlimited opportunities of indulging it return. The sphere itself has no bounds: if the seven notes in music are found inexhaustible, the combinations in Gothic art must be as much so. Be it that a peculiar charm would accompany when all was new; yet, notwithstanding, if the means and demand be presented, the gifted practitioner, finding no limit to his encouragement, will have the same fascination in design as formerly, and revel in a luxury that will never satiate. Those only who have a true taste for it know its untiring interest. As far as the pleasure in the work is essential in order to recover the success of former times, all is assuring, provided that equal munificence can be called forth.

3. We have in the third place to consider, that formerly the whole mind of the man of genius was, in a manner, concentrated unremittingly on his creations. We may imagine how some Peter Lightfoot, or cloistered monk, would pursue uninterruptedly his avocation, as if he lived only to beautify his abbey church; or the æsthetic brilliancy that would be brought to bear from some archbishop devoted to the work, as William de Melton, it may be, during the rise and progress of the nave of York Minster. In this respect past advantages are not to be recovered, for we cannot ask for such seclusion again; but we submit the question,—Can we in our great works, upon the adoption of a more perfect practice and study, obtain its equivalent? If less were undertaken in order that increased attention might be given, possibly equal excellence in design might be attained to; but the difficulty is in the compensation, which must be so regulated as to admit of the required application.

4. This brings us, in the fourth place, to inquire more particularly into the system of practice in the olden time, which gave a circumscribed and a more fixed sphere of labour to the responsible architect. Upon this somewhat obscure subject we cannot enter without first briefly referring to an institution which has its bearing on more than one point before us: we mean Freemasonry; not in the form it has existed in since its revival at the beginning of the seventeenth century, but in its Mediæval system. Much secrecy and mystery attended it, which partly accounts for the obscurity in which history leaves us as to architects and their operations. We know, however, that from a very early date there was an organised fraternity of masons, who, from travelling and observation, as well as practice, gained intelligence, and by well-devised plans, communicated the benefit to their whole body as far as practicable; the members constituting an order, partly religious, in some sort, and partly professional, with one object and interest in common. The importance which architecture then possessed as an art can scarcely be overrated: for which reason the organisation was fostered by the clergy; the rearing of religious structures was allowed to be monopolized by the freemasons; and it is a fact that ecclesiastics were frequently *associated*; which circumstances render more intelligible the zeal of the masons, both in accumulating, and in confining to themselves, the knowledge of their art. It is also evident, from the curious correspondence in the details of work, that the organisation was very complete; and, as it is to be inferred from the remains of structures of the later period of the Roman empire, from a universal similarity of arrangement, that there was a central control, the same principle may have been transferred from Roman usage. The silence of history leaves us very much to conjecture concerning the main agents in the erection of our ancient edifices. The rearing of them, as a trade, would be in the hands of the freemasons (that name implying workers in freestone, or *freestone masons*), and much would depend on the wardens, who were the foremen of parties of ten of them, and upon the masters; but in a great undertaking some presiding man of genius, whose skill alone qualified him, must have had the chief control. Priests possessing a taste for it were not only associated in freemasonry, but readily initiated; and from that class sometimes would arise the pre-eminent architect. Architectural ability, indeed, seems to have worked its way to this position by association with, or development amongst, the freemasons. With the mysteries and emblems that have come down through this channel, even from the Egyptians and Grecians, our inquiry has no concern; but it is material to note that the secrets of the masonic art, whilst confined to themselves, were disseminated unreservedly amongst that body. Selfish ambition and jealousy would thereby be obviated: every man of taste could enter the association; and thereupon his suggestions became the common stock of the fraternity, available to the architect, who would be associated with them in his labours. In proceeding to consider the limited sphere of the chief architect, we have to note how originality in design was prized as a principal item of merit. For, in contemplating the extraordinary productions of the Middle Ages in the better period, one is struck with the variety and the prolific inventions. How diverse is York Cathedral from Lincoln, for example: how unlike are they both to Ely; and so on to Salisbury, Wells, and almost all others. Now this indicates as many chief architects as varieties, and the sphere of labour accordingly limited. It would be an historical problem to find the same architect to have been the designer of many cathedrals: rather was he engaged only for what he could entirely devote himself to. And, unless similar advantages can be secured, it is vain to look for equal originality and beauty in modern productions. Is it possible, then, we are tempted to ask, in any way to bring about a change in the present system? To apportion in some degree, for instance, to leading architects what is more strictly design only; relieving them of much of the constructional responsibilities, and giving such compensation as would command their time more exclusively for the important part devolving upon them? This is a question which, we are aware, the profession only are competent to grapple with; but as those great attainments to which we aspire seem in some measure dependant upon it, we shall not be out of place in pressing it on public attention. We conceive such a change is not altogether impracticable. Progress has, in the present century, completed a separation of the labours of the architect from those of the builder. A diversion has been made, too, in favour of the civil engineer; and we may suppose that a further subdivision of labour in the highest sphere is within the range of possibility. Or we may ask the question,—Can the labours of leading men in any other way be lessened? At present any one whose brilliant attainments have raised him to eminence has his reward in a killing amount of work, whereby one great genius, at least, has already fallen a victim. Only the same percentage is paid as to the inexperienced. How much better would justice be done on both sides if, instead of advantage being obtained by the ablest men in the extent of their employment, it were given in increased percentage? This might secure the necessary limitation of labour, and, therewith, more satisfactory results. It must be evident that they whose works are to endure in a manner for all time,—being ecclesiastical and national, or of the first class,—can only receive and do justice when the opportunity of sufficient application is secured to them. Unlimited application carried the day formerly; and without it equal success is not attainable. In a small way, France seems to be taking the lead in this matter. There "some architects having private property of their own, only make use of their professional acquirements in the carrying out of the design of one or more tombs, either for their friends or for some great personage; a tomb being regarded by French architects as the highest possible ideal of the art." It is, we apprehend, mainly a question of large and adequate compensation. If so, to obtain it, we must look to a greater appreciation of design. This will advance in proportion as a general taste is cultivated; and whilst the effect of such cultivation will be also a corresponding improvement in the art, success in design will attract attention and reciprocally encourage the cultivation of taste. Then, if the movement be fairly commenced, such is the disposition of the various influences to run in the same current, that we need not despair of a revolution that will eventually advance architecture again to its supremacy in the school of arts; and the results will leave vestiges which will command for us an honourable position in the estimate of succeeding generations. The munificent offer for designs for the Liverpool Exchange may be regarded as a good experiment, and encourages what we have ventured to advocate.

5.—Lastly, it has been intimated that in Mediæval practice help was acceptable to the architect from any quarter. There must have been encouragement to, and ingenuousness in receiving suggestions. At all events, the chief architect would accept them from his ecclesiastical employer, whether an associated mason or not, in many cases; and in others, where the ecclesiastic might be chief, he would be on terms of candid partnership with his masons. In present circumstances, the amateur part of our question is difficult to be brought to bear, and delicate to broach; but it is necessarily connected with the subject, for the part borne by the amateur in the old system is a leading feature. That formerly Wykeham and others, not professed architects, had their fingers in work which is now held in such rapturous admiration can scarcely be denied. Alan de Walsingham, the sacrist at Ely, became architect of the cathedral; and, after the fall of its centre, gave it its culminating grandeur. A bishop of Noyon was originally an artisan, and rose to that eminence from his skill as a goldsmith. Other examples might be referred to, but these are sufficient to show how in those days the interests of the church, excluding considerations of personal fame, gave to skill and taste an open door. Assistance then was accepted wherever merit recommended it, and taste was invited in whatever brain it existed; appetite for beauty, together with religious zeal, having sway over every other feeling. The bishop, with the clergy around him, and a troop of freemasons, would form a college of artists; eager, not only to devise, but to obtain from any source whatever what would tend to the adornment and splendour their cathedral. It is true that circumstances are now very different: we live not in a recluse, but in a mercantile age, and the trade element is perhaps unavoidably too preponderating to give free course to the practice of art. We shall venture to say, however, that the crudeness which attends the amateur need not make his suggestions contraband now any more than formerly; and recovering past advantages, does it not enter into the question, what auxiliary service he can be useful for? Can this suggestive element, if we may call it so, any way re-enter, and the amateur again take his part?—or, in other words, can we have a benefit by adopting some plan for taking advantage of the drawings of non-professional persons, when anything new and valuable occurs to them. If institutions for exhibiting and rewarding designs were candidly open to amateurs in competition with others; whilst every advantage would still remain with the educated architect, exceptionally an amateur might be brought forward, and, not

"Born to blush unseen,"

quit his false position and join the profession. Taste has its occasional inspirations in the rough, and sometimes of the richest quality, possibly, without the pale of professional cultivation. Provided amateurs could,—not by botching on their own account, but in some legitimate way,—be made useful, it would moreover tend as much as anything to that general diffusion of taste, which is the only atmosphere in which the profession can vitally prosper. As a polite accomplishment, architecture to some extent (we refer to artistic

design only), admits of private pursuit like other fine arts; and it is important to remark, that the public, since they have the patronage, should be adequately educated that they may better exercise it. The Mediæval system, like the ocean, received the stream from every channel; and if architecture for its own sake is to be promoted,—if a general taste is to be fully cultivated, and the attainments in this age rival the past,—whilst the responsibilities rest with the profession, the practical study of the art, it would seem, should be open to all who are capable of it; and, in a subordinate form, non-professional help again become tributary.

Upon reviewing the circumstances that favoured architecture in times gone by, it must be owned that the difficulties of competing with antiquity are great. The advantages grasped by the art were more than peculiar—human faculty was then in a manner sold to it: in the *dark ages* we see genius arbitrarily extinguished save in this one phase; and the whole light of the intellectual firmament at that time may be regarded as absorbed from others to be concentrated on this subject. We can point to a hundred years, in which about a hundred abbey and cathedral churches of first-class character were erected in this country, when it possessed but a tithe of the present population and means. Now, the modest demand for only one such cathedral to recommence with may be too much to be realized; and, if so, puny in comparison is the revival of Gothic architecture. Without going to Mediæval extremes, to impart the necessary feeling is no small matter; for not the despotic potentate and feudal lords, nor a paramount hierarchy, but a whole people have to be moved to do themselves credit. Yet, notwithstanding, the present age having the ability demanded, with far greater wealth, greater facilities for travelling, and various better helps for acquiring intelligence and proficiency, we ought not to succumb to the past. And if taste received only the utmost rational fostering and encouragement, it is not presumptuous to say that, instead of being behind, we might hope to distance our forefathers in the race of architectural development.

THE CURRENT OF ARCHITECTURE.*

CHARTS to exhibit the chronological sequence of styles, and to present at a glance, information as to what different styles were contemporary, naturally suggest themselves to most searchers and expounders of the history of architecture. Charts of general history, and even of the progress of literature, and of painting, have long been in use; though more advantage might be derived from such appliances in teaching. The Germans have done much in the way of compilation of these tables. One of the most instructive, and best known forms, which we believe originated in Germany, is that of "the Stream of History," wherein the ruling nationalities are represented in the form of parallel rivers, or streams; which absorb, flow into, or branch out of one another, after the same manner as the nations became absorbed or branched out. Mr. Huggins has been the first to apply this idea to the illustration of the history of architecture. In connexion with a synoptical table of the styles which we find in the volume which is before us, accompanying the chart, and the chapters themselves of the volume (some of which have before appeared), the chart will form the basis of many future improvements in the method of illustration, and of much more exact appreciation of the contemporary facts of architecture, than can now be said to exist. Existing publications in the form of chronological charts of architecture, are confined to single countries, or to some few centuries of the succession of styles; and the true teaching of architectural history does not come forth in them at all. Architectural history, however, altogether, has only lately been properly attended to by English writers; and the discovery of the fact that comprehensive study of such history has an immediate bearing upon the production of art of the future, may be said to have been made during the period of the existence of, if not also by the help of, our journal. Mr. Huggins owes of course something to the labours of writers like Mr. Fergusson; and he acknowledges all assistance of this kind; but he has certainly contributed to the elucidation and exposition of the facts, and to the placing in the proper light the question which forms the heading of one of his last chapters, "The Style of the Future."

Mr. Huggins's disposition of the styles is a compromise between the chronological and the geographical. In the chart, "Mexican" and "Peruvian" appear as distinct streams, to the extreme left, or west; whilst "Buddhist" and "Chinese" are as similar streams to the right, or east; though research may eventually show connexions, in the case of these four styles, with members of the central group, which the chart does not attempt to indicate. The great styles of Europe, Asia, and Africa, are as nearly as possible, in their proper places, the Gothics being westward, and the Byzantines and their offspring (the Saracenics), eastward, of the central classical trunk. In the demonstration of the line leading on to the later Italian styles, from the earlier, there is some omission of the thin stream of pure Roman which was never altogether dry in Rome, whilst a stream of Romanesque directly to the Venetian-Italian, is the only apparent connexion; and the styles of one and the same country, Venetia, must be looked for in two different positions, geographically, of the chart. Moreover, the derivation by the Greek style, of Ionic elements from the Assyrian, noted in the volume, appears to be ignored in the chart. Further, the tints of colour, which are changed as the streams flow, or ramify, do not seem to us quite what the author intended. These are features of the chart, showing the difficulty of the task, for which we are, nevertheless, indebted as having been to some extent accomplished.

The influences operating in the generation of styles, or during their transition into other forms, the author observes, proceed "at one time from a neighbouring style; at another, from the spirit of a new religion; at a third, from the energies of a new race." Some of the rays of influence, he indicates on the chart as proceeding from orbs of Christianity, Islamism, National Characteristics of Teutonic tribes, and Saracenic art. The first of these generated the Christian Romanesque out of the Roman; the second, the Persian, Indian, and other Saracenics, out of the Byzantine and Sassanian (the Sassanian being the freshened stream of the Persian-Assyrian, with Roman confluents), and also generated the Turkish Saracenic offshoot from the Byzantine,—although "the later modifications of Arabian architecture" are pointed out as "owing to the introduction into the Mahommedan community of nations, of new races—Seljukian and Ottoman Turks, Pathan and Mogul Tartars, &c.",—the Teutonic characteristics generated the Lombardic and Rhenish, the Frankish, Burgundian, and Norman, the Anglo-Saxon, and the Spanish Early Gothics; and the Saracenic art, through the Crusades, produced pointedness.

In the volume, the chapter on Egyptian architecture, and the remarks on the same style towards the conclusion of the book, show full appreciation of the style. In the chapter on Christian Romanesque, it is noted that the Jewish synagogues, being places not only for worship, but, like the Pagan basilicas, for holding local courts of justice, would not be without influence upon the form of the first Christian churches. In one of the concluding chapters, the author names some of the styles, native or adopted, which he rightly considers would deserve to be placed in a representation of the "course and current of architecture," did we know more about them. Such are the styles of the architecture of the Phœnicians, and the Lydians; and of the inhabitants of Pergamus, Galatia, and Cappadocia; of ancient Iberia, and even of Britain. But he believes a review of the ground traversed in his volume, will show that the most potent influences brought to bear on the career of architecture, are those of religion and race; and that "climate, local scenery, and geological structure," only give rise to subsidiary varieties. And he says:—

"Difference of race, like difference of religion, has divided the styles of the world into groups, so that they have a general ethnographic arrangement as well as a theological, which may be expressed thus from West to East:—Teutonic, Celtic, Slavonic, Arabian, Tartar: the Teutonic branches being those of the Gothic styles; the Celtic of the Romanesque; the Slavonic of the Byzantine; the Arabian of the earlier varieties and developments of the Saracenic; the Tartar of the later."

The generation, from the Roman stem, of the succeeding styles, was "almost entirely the achievement of the influences of religion and race." Next to the agency of religion and race in the development of styles, is the influence of styles upon one another. But to these influences, is to be added that of events involving changes in political and social condition, or literary or scientific status. It would appear that our author ascribes less importance to *materials* available for buildings than sometimes has been ascribed. Yet this point deserves some attention, even for the larger divisions in classification. The early Romanesques, probably derived a distinctive character, as generally supposed, from the possession of those materials of Roman buildings which were so largely made use of.

In the chapter on the Style of the Future, before adverted to, there is much matter which is accordant with our own expressed views. Beyond this, the author does much to show what may be derived of new art, from all the styles, whilst preserving a general unity. Such unity he does not look for by proceeding from the style of buildings which, to him, he says, always look like reproductions of Mediæval structures; but from the classical columnar architecture, for which, however, he indicates numerous additions to it, elements of change, and freshness. He distinguishes between the condemnation of windows behind the columns of a portico, and the tendency once manifested towards dispensing with them altogether in buildings of classical character, whereby many atmospheric effects were lost. Amongst his suggestions, are those of modifications in the Corinthian, to which order he would give columns for interiors of much more attenuated proportions than those of the ancient examples, and for exteriors more massive character, as required by our climate; whilst the capitals he would compose less thickly of foliage, as to the covering of the bell, in order that the supporting office of the member might not seem interfered with. He would derive numerous suggestions for the decoration of supporting members, and other structural parts of architecture, from the Egyptian and Indian, as well as other styles. He takes the same hopeful views, as we have, of the capabilities of our race, or opposed to those who "forget that the blood of a score of different tribes of mankind is flowing in our veins as well as the Teutonic," and so concludes what (looking over some few errors of the press, which should not have been allowed to remain,) we must regard as, with the chart, a well-timed and useful contribution to the popular knowledge of architecture, its examples and history, and to the future progress of architecture, the art.

* "A Chart of the History of Architecture, showing under the Similitude of Streams, the Rise, Chronological Sequence, Relations and Periods of the various known Styles of all Countries and Ages." By Samuel Huggins, Architect. London: Printed in Chromo-Lithography by Day & Son, and published by them, and by John Weale. April, 1863.

"The Course and Current of Architecture: being an historical Account of the Origin, Successive and Simultaneous Developments, Relations, Periods, and Characteristics of its various known Styles." By Samuel Huggins. Designed as a Companion to his "Chart of the History of Architecture."

WOODEN BRIDGES BY THE UNITED STATES ARMY.

MR. RUSSELL WEST, writing from Philadelphia, gives us particulars of some of the railroad bridges which have been rebuilt by the United States army.

The truss frames of the bridge which carried the Richmond, Fredericksburg, and Potomac railroad over the Potomac creek having been burned by the Confederates, the soldiers of General M'Dowell's army, in May, 1862, under the direction of Brig. Gen. Hanpt, constructed a trestle work 400 feet long and 80 feet high, which has for more than a year carried daily from ten to twenty heavy railway trains, and has been frequently and severely tried by freshets in the river. It was built in nine days, chiefly of round sticks cut from the woods in the vicinity, and not even divested of bark. It is four stories in height,—one of crib-work and three of trestles. The legs of the trestles are poles from 9 inches to 12 inches in diameter, and about 25 feet long, the ends dowelled together with 2-inch wooden pins. The diagonal braces are also round poles, very little sawed timber being used in the structure. The bridge over the Rappahannock, 600 feet long and 65 feet high, was rebuilt in a similar manner by the same army.

Gen. Hanpt is a civil engineer, and was for many years in the service of his native state, Pennsylvania.

A VOICE FROM GENEVA.

IN this ancient and beautiful city there has been a meeting of watchmakers and other manufacturers to consider the subject of Sunday labour and recreation. This meeting seems to have been attended by both the employers and the employed. On this occasion it was observed that Monday replaces Sunday for a number of workmen, but whilst Sunday rest is ordinarily given to the family, and suitable recreations, Monday has almost always a very different

character. It was wished that the public museums, libraries, public establishments, and divers collections, should be opened by degrees on Sundays after morning service. The objection that this would force the *employés* of these places to the exercise of their functions was argued, but it was said that this inconvenience would be small compared with the advantages to a whole population, and that it was very easy to insure to the *employés* sufficient rest by small administrative precautions. In suppressing a working day, the effective quantity of work accomplished is not diminished, because the man properly rested has ability to do more than he who has not had the necessary repose. England, where Sunday is better observed, sustains advantageously its place with the other countries of Europe. It appears that a great number of the manufacturers of this city have discussed this question amongst themselves, and tried to resolve it in a truly liberal spirit without the intercession of the State. The same problem has been brought before the French Senate, under a different form; in effect, nine inspectors-general, or engineers-in-chief, of bridges and roads, three generals, and eight architects of the city of Paris, and of the Government, solicited the intervention of the Senate to obtain the boon that work might be discontinued on Sundays in Government dockyards. It was mentioned that in consequence of the want of a weekly day of rest, a country which formerly furnished fine men for cavalry regiments, furnishes to-day infantry of but small stature; and that the want of Sunday's repose causes the need of a holiday on the Monday, in which the most part of the family cannot partake; and on these Mondays it is said "that a man may be seen, glass in hand, drinking, with shaking hand, the blood and tears of his wife and children. It is objected, it is true, that the wants of man are the same every day, therefore work ought to be carried on every day wherewith to serve these material wants. But England, who knows how to observe the Sunday, what does she make of this objection? She passes beyond it, convinced that she is quite right—that rest on Sunday can be but an element of prosperity for the family."

THE GENERAL HEALTH.

THE Registrar-General, in his last quarterly return, tells us that small-pox carried off 788 persons in London, or nearly nine daily; and scarlatina and diphtheria, 1,230. "Though the former disease carried off fewer persons than the latter," he says, "it was more powerful in inspiring the public mind with a salutary dread." He adds,—"It should not be overlooked that prophylactic measures are available against scarlatina as well as small-pox, and both maladies are subject to modification." Small-pox was not confined to London. "Its presence, which in some instances assumed a character of virulence, is announced by registrars in many and distant parts of the country." "Not only small-pox, but also measles and scarlatina, attacked the industrial populations both in Lancashire and Yorkshire."

The deaths in London show an increase; and in Lancashire and Cheshire, the districts which have suffered most from the recent distress, the increase is more considerable.

In London the deaths "rose from 15·230 and 15 695 in the June quarter of 1861-2, to 17·417 last quarter;" but in the north-western counties they rose from 17·576 and 18·017 to 19·467. In Oldham, Manchester, and Warrington, the increase in the last quarter on the mean mortality of the two previous seasons is 20 per cent., and in Chorlton and Wigan 25 and 24 per cent. Measles and other epidemics are spreading throughout these parts; and it "is probable that fewer deaths have been registered in many districts," owing to the emigration or removal of the inhabitants; for, doubtless many places are situate like Belmont, respecting which the Registrar writes, "that it is almost uninhabited, owing to the badness of trade;" and it must be regarded as a providential interposition in favour of the under-fed and under-clad workmen and their families, that the period embracing December and four succeeding months was distinguished by a higher temperature than any corresponding period since 1771.

Throughout the whole country the number of births has increased except in Lancashire and Cheshire, where they have decreased; and in that district the population is perishing by disease as surely as it is in the United States from the perils of war.

The distress in Lancashire and Cheshire is lessening: considerable numbers have emigrated, and it is satisfactory to note that the last report of the central executive relief committee mentions that a large number of ablebodied men included in those "out of work" have been enabled to find temporary employment in various out-door occupations; 4,718 operatives have left for New York and the colonies; and it is pleasing to find that wherever out-door employment has been provided by the local committees the operatives have become skilled in their new occupation. Their physical condition has been greatly improved; and there can be little doubt that the works about to be undertaken under the provisions of the recent Act, will largely contribute to an equally beneficial result.

SANITARY CONDITION OF LONDON DISTRICTS.

THE seventh annual report to the Vestry of St. James's, Westminster, has been made by the medical officer of health, Dr. Lankester, and printed. It relates to the year 1862. The total number of deaths was 727, being slightly in excess of the average of the last seven years, which was 718; but below the mortality of the previous year; thus on the whole representing a favourable state of health in the parish for 1862. The mortality of the Berwick-street division, the most over-crowded and poorest in the district, has never been so low any year of the last six as last year. This district has been most acted on by sanitary measures, and the utility of this action, as in so many other instances, thus seems to make itself manifest. Whilst in 1861 whooping-cough claimed the greatest number of victims amongst zymotic diseases, scarlatina carried off the greatest number in 1862. In no one year has any of these contagious forms of disease been so fatal as scarlet fever was last year. Of sixty-six cases twenty-nine occurred in the Berwick-street division, thus clearly showing that where the population is most overcrowded, there this disease is most deadly. Dr. Lankester recommends the vestry to use their influence with the magistrates to prevent the licensing of cowhouses altogether. The milk is unwholesome, the practice unhealthy, and property is deteriorated wherever cows are confined and crowded amongst human beings as they are in London; and besides, an abundance of good wholesome milk is now obtainable by railway from all parts of the country round London. Under the head of overcrowding, the reporter states that upwards of 200 kitchens and lodging-rooms have been emptied; but he fears that, while emptying is going on in one direction, overcrowding goes on in another within the same limited area.

The seventh annual report for the Holborn district, by Dr. Gibbon, has also been printed. In 1862 there were 1,468 births and 1,238 deaths in this district: these occurred in a population of 46,317 persons. The births, therefore, have been in the proportion of 31·7, and the deaths of 26·7, for every 1,000 of the inhabitants. In all London, the average birth rate was 33·7, and the death rate 23·5 per 1,000 of the population. While, therefore, the proportion of deaths in the district has been above the average for the metropolis, that of the births has been a little below it. In 1861 the epidemical scarlet-fever and whooping-cough sent many patients to the Children's Hospital; and, during the past year, the typhus epidemic has compelled many of the inhabitants to enter fever and general hospitals. It is satisfactory to observe, that the deaths under two years of age are not so numerous as in former years. This year they are 24 per cent., whereas last year they were 28 per cent. on the number of births. The distribution of the deaths, excluding those occurring in the workhouse and hospitals, varies according to density of population. Thus, the proportion of deaths was highest—viz., 23·6 per 1,000 of the population—in the St. Andrew Eastern Sub-district, where there are 392 persons to every acre of ground; then come Saffron-hill, with 21·0, St. George the Martyr, with 20·0, and the Liberty of Glasshouse-yard, with 19·3 per 1,000. The last is an exception to the general rule, as it ranks second in density of population, having 291 persons to an acre.

In an appendix, extracts are given from the fortnightly reports of the officer of health. Under the head of "A Fever Nest," he says (July 28th, 1862):—"Cases of low fever have increased from 5 to 22 cases. These have occurred chiefly in Mr. Gibson's district, especially in Ely-court, Holborn, which is under the sanitary supervision of the City Commissioners of Sewers. I have deemed it right, in forwarding a written complaint from one of the neighbours, to inform them that although the houses have been cleansed and lime-whited, they are still pervaded by a sickening sewer-smell, in consequence of the drains being defective and untrapped, and the closets without water-supply, and, in some instances, overflowing with soil. Several of these densely-peopled houses are without a drop of water on Sundays. If any one is desirous of seeing the influence of proper dwellings on the physical, moral, and even intellectual condition of the poorer classes, I advise him to visit this wretched court, and contrast the squalid, half-naked, plague-stricken appearance of the inmates, who are constantly inhaling an atmosphere of decomposition, with the orderly, healthy-looking, and clean inmates of the adjoining Black Bull Chambers."

And, under the head of Fever (June 30th, 1862), he says of Fullwood's-rents:—"Since your last meeting, in company with your inspector of nuisances, I have made a house-to-house examination of Fullwood's-rents, where there has recently been a good deal of low fever. All the houses are old, and more or less dilapidated. Although the rooms are lofty, some to the extent of 41 feet, the staircases are dark and unventilated. Several of them require to be cleansed and limewashed, and to have the water supply reinstated or improved. Unfortunately the ventilation of the court is impeded by the low entrance from Holborn, and the stone wall on the side of Gray's-Inn-gardens; otherwise, I know of no other court so admirably circumstanced for salubrity. Not only is it well drained, and in close proximity to the large garden of Gray's-Inn, but the houses themselves, especially those on the east side, have each a considerable piece of garden ground attached to them. As several of the houses are to be sold, it has occurred to me that it would be an admirable spot for the erection of model dwellings for artisans. If we may judge from the success that has attended the erection of the Black Bull-chambers, Holborn-hill, the demand for dwellings of two or three good rooms is great in this locality. It might be desirable, therefore, to direct the attention of the trustees for the outlay of Mr. Peabody's munificent gift to this as one of the eligible spots in London for the erection of such buildings."

THE STEAMER "BARON OSY."

THE work of raising this vessel was commenced early on Saturday, the 12th instant. Chains having been passed under her bottom, and lighters pinned down to them at low water, warps were laid out to haul her into the shore as she lifted. One of Norton's V-shaped pumps was placed over the fore hatch, and one of Fowler's centrifugal pumps over the after hatch; but the leak being in the fore part of the vessel, and the compartments having stood with very trifling leakage, the brunt of the work fell on the first. When this was got to work, it was found that it reduced the depth of water forward at the rate of 2 inches per minute. The area of the compartment is 57 feet by 22 feet by 14 feet. In thirty-five minutes after commencing work, 5 feet of water had been pumped out, and the vessel rose on the early flood and was safely got over to the south shore of the river, where the rent in her bottom will be temporarily repaired, previously to her going into dry dock.*

SOMERSET ARCHÆOLOGICAL SOCIETY.

THE fifteenth annual meeting of this Society commenced on Wednesday, the 9th instant, at Wells. In the county magistrates' room of the Town Hall antiquities and curiosities were arranged as a temporary museum.

The annual meeting was held in the Council Hall; the president, Mr. F. H. Dickinson, in the chair; when the report was read, which congratulated the Society on its continued prosperity. Mr. E. A. Freeman then gave a notice of the antiquities of Wells; and Professor Willis discoursed, as he had done on previous occasions, on Wells Cathedral. He gave a minute account of what he believed was the original form of the church. He said it was shorter than it was now, and was elongated in the fourteenth or fifteenth century. Originally the end was square, and he believed there was no apse. There was now a polygonal lady-chapel at the east end, and aisles had afterwards been added to connect it with the church. He supported his view as to where the

* We give dimensions, &c., of the pump:—A pair of 8-inch V's by 12-inch stroke, 10-inch suction-pipe, worked by 6-horse-power engine, seventy revolutions, 35 lb. pressure of steam. Consumption of fuel, 94 lb. per hour.

original church ended by details respecting the stonework and its peculiarities. The chapter-house, he went on to say, was one of the most beautiful examples of its kind. Returning to the nave, down which he conducted his audience, from east to west, he said the character of its architecture was unlike that of any other cathedral building, and deserved to be called the pure Somerset style. It was very beautiful, and did credit to the county. The work was not the work of masons sent for from elsewhere, whereas in all other specimens of Early English they found the same mouldings and methods of building, varied only by some difference of material, showing the work to be of the same school of masons. All of a sudden, when they got to the west end, they found a change, as if an architect had been then called in, like Mr. Scott, of the present day, who would have his own way and his own style; for they then had Early English, and not the Somerset style. The two styles were mixed together in the most complicated way he had ever seen. If they examined the spandrils they would see that three remarkable changes had taken place. The work, in his opinion, was commenced, continued, and carried on westward, in order of time. The west front was of somewhat later date.

At the evening meeting the Rev. F. Warre produced a plan of the earthworks at Masbury Hill, which it was not deemed advisable to visit on that occasion. Mr. W. A. Sanford read a paper on the Coal Strata of the County, and Mr. W. B. Dawkins one on the Antiquity of Man. A paper on the Roman Villas discovered at Bath was read by the Rev. Prebendary Scarth. He described seventeen villas within seven miles of the city.

On Thursday morning the members reassembled at the council hall, the president in the chair, when Mr. J. H. Parker delivered an address on the ecclesiastical houses appertaining to the cathedral, as to which like Professor Willis on the cathedral itself, he had expatiated on previous occasions. Mr. Parker's lecture was illustrated by large plans prepared by Mr. Hippisley, and sketches drawn by Mr. A. Clarke. After Mr. E. A. Freeman had read a paper forwarded by the Rev. J. F. Dymock, on Vicars Choral, and the Rev. A. Ducane one on the Vicars Choral of Wells, the members and their friends, to the number of more than 200, adjourned to the bishop's palace, to which they were cordially welcomed by Lord Auckland, and over which they were conducted by Mr. Parker. Here Professor Willis and Mr. Parker had a discussion about certain alterations of the towers adjoining the chapel. Mr. Parker then conducted them through the vicar's kitchen, and a house he had himself lately purchased and restored in a way to surprise those accompanying him. Mr. Parker stated that his attention had been attracted to this ancient building by a notice affixed,—"This malt-house to let." One of the vicar's houses, also restored by Mr. Parker, was next visited: it had been converted from a miserable ruin into a comfortable abode.

At the evening meeting, Dr. Daubeny read a paper on agriculture, principally relating to the question of sewage utilization; the Rev. T. Hugo one on Minchin Berrow Priory, near Bristol; and the Rev. G. Williams another on Bishop Beckington. The company, by invitation, then assembled at a *conversazione* in Mr. Parker's restored house.

On Friday, the members again assembled at the council hall to hear the reading of papers, which were more numerous at this than at any former meeting. The party then proceeded to St Cuthbert's Church, upon which Mr. Freeman read a paper.

Afterwards, the archæologists went on an excursion to Wookey Hole, Hyæna Den, Castle-hill, Ben Knoll, finishing at Somerleaze, and thus terminated a highly successful meeting.

THE LATE MR. WILLIAM RANGER.

Mr. William Ranger, civil engineer, who died on the 12th instant, at his residence, St. George's-square, was known of late years, chiefly from having been employed by the Board of Health upon many of the inquiries into the condition of towns, preliminary to the provisional orders and application of the Public Health Act. His reports include those on Aylesbury, Barnard Castle (two), Barnsley, Cambridge, Chatham, Cheshunt, Coventry, Crumpsall, Darlington, Dartford, Dewsbury, Doncaster, Edmonton, Elland-cum-Greetland (two), Enfield, Grimsby, Halifax, Hartlepool, Heckmondwyke, Hexham, Hertford, Hitchin, Hoddesdon and Broxbourne, Leicester (besides one on the burial grounds), Northallerton, Northowram and Southowram (Halifax), Romford, Ryde (two or three), Shipley, Shirley, New Sleaford, Southampton, Spalding, Stockton-on-Tees (two), Thurmaston, Tottenham, Tynemouth, Uxbridge (two), Wakefield, Waltham Abbey, Ware and Great Amwell (two, and one on the burial grounds), West Cowes, Whippingham (two), and perhaps some others, besides that on Croydon, for which he was associated in the inquiry with Mr. Page. Some seven or eight and twenty years ago, Mr. Ranger's name was most known in connexion with a patented system for the formation of concrete in blocks for the building of walls in the manner of masonry. The principal applications of the material that we can call to mind in London buildings, were those in part of the Wellington Barracks, and in Barry's front of the College of Surgeons, Lincoln's-inn-fields. In these cases the effect was superior at least to that of cement; but in some buildings in which the material was employed, the durability for ornamental accessories, if not plain surfaces, has not been found sufficient. Still, the artificial stone of the College of Surgeons is in as good a state as the natural stone of the hall and library of Lincoln's Inn, hard by,—of so much later date. Mr. Ranger died aged 63. He was a Fellow of the Royal Society.

ROCHESTER AND DOVER CASTLES.

In his paper read at Rochester already alluded to, the Rev. C. Hartshorne agreed with those who ignore the popular belief that Rochester Castle was constructed by Bishop Gundulph, as from documentary and other indisputable evidence the present building was erected some years after the death of that prelate. Taking his stand in the garden ground beneath the castle, Mr. Hartshorne explained that the outer wall was erected in the fourteenth century, and the space it inclosed filled with buildings all in connexion with the castle. Passing into the interior of the keep, Mr. Hartshorne stated that there was little or no doubt that it was built by William Corbyl, Archbishop of Canterbury, between the years 1126 and 1139. There was a tower, doubtless built by Gundulph, but not the present tower, which was erected some years after that prelate's decease. There were, again, certain marks in the tower which placed it beyond dispute that it was not the work of Gundulph; the joints, &c., of the several arches being altogether different from the form he used. The fine Norman keep was second only to Dover, which was a little larger than the keep at Rochester. They had evidence to prove that Dover Castle cost, for its erection, the sum of 1,200*l.*; and as the castle at Rochester was a little smaller, he should fix the original cost of that building at 1,000*l.* Taking, therefore, the present depreciation in the value of money, 1,000*l.* of the period mentioned would be about 25,000*l.* of the present day. The bottom of the castle keep was originally occupied by the stones, armour, &c., and the first floor and upper stories by the retainers. A well within the keep supplied water for the inmates. A beautiful arcade, a portion of which was now fitted up by a stone screen, ran round the building. It was evident the tracery work could not have been executed by Gundulph, as it belonged to a period after his death. A portion of the castle was knocked down in 1214, and rebuilt in 1227; and from the injuries to which the castle was always liable from war there was little doubt that the work of repair was constantly going on within it. With regard to the situation of the chapel which undoubtedly existed within the castle he could not speak with certainty, although he believed it was in the south-east corner of the building.

THE CHOIR OF WORCESTER CATHEDRAL.

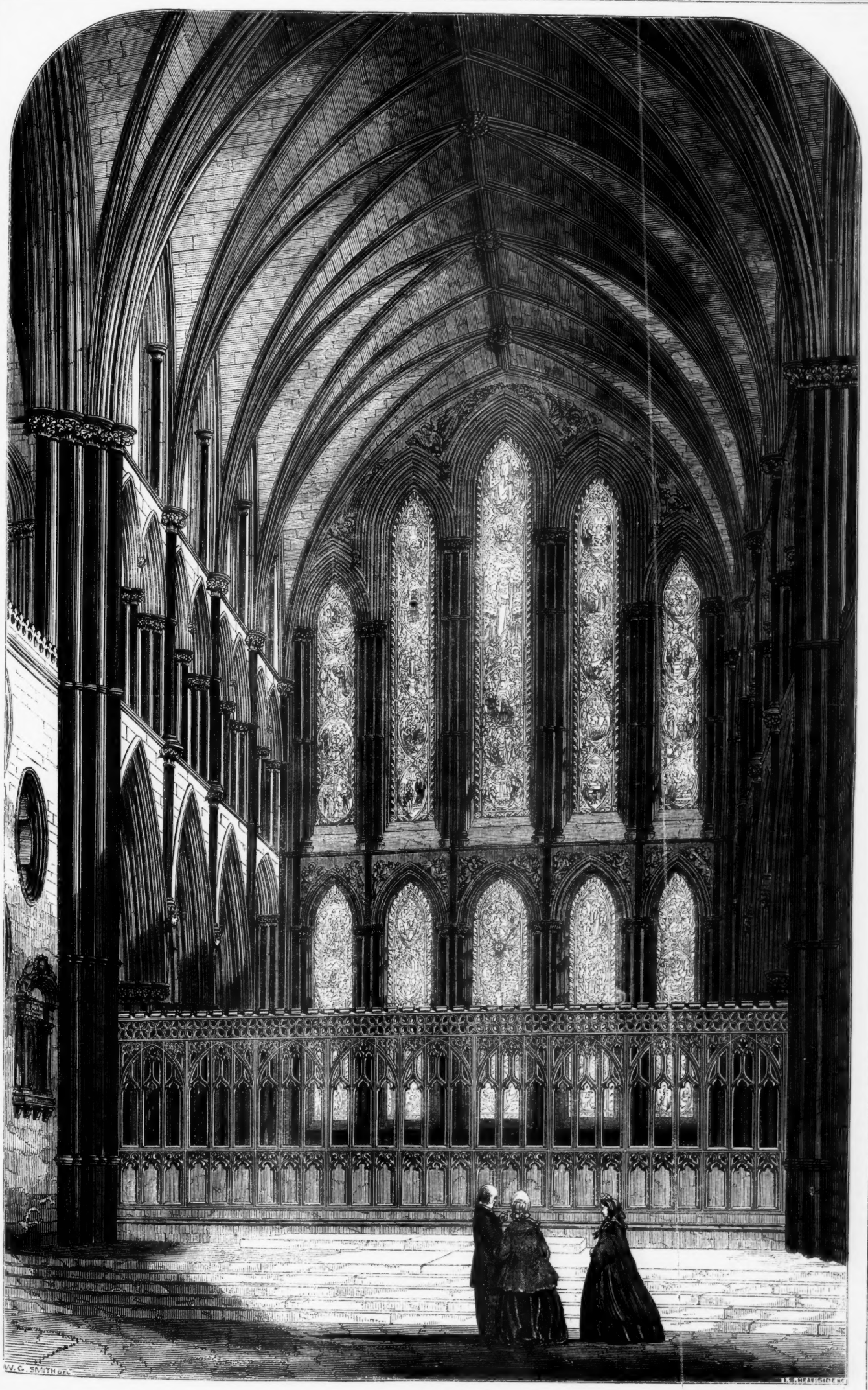
The Musical Festival recently held in Worcester Cathedral has led to many notices of the present aspect of the venerable building, and provoked some curiosity which the accompanying engraving may satisfy. It shows the east end of the cathedral, as restored under the direction of Mr. A. E. Perkins, of Worcester. The new east window replaces another inserted about the beginning of the present century, of the poorest design and details, and filled with stained glass of the worst description. That window, though so recently inserted, had, together with the gable and adjoining walls, become so much dilapidated that an extensive repair, amounting to an almost entire rebuilding of these parts, was necessary. On careful examination of the eastern portion of the walls, indications were found of what the architect believed had in all probability been the position of the Early English window which he supposed occupied the position. As no traces whatever remained of a more *recent* ancient window, it was judged expedient to put in one of Early English design, using as authority the windows of the two eastern transepts, which parts, together with the choir, lady-chapel, &c., form an unbroken pile of Early English architecture. The present window was inserted at a cost of 500*l.*, and is of Corsham Down stone, with Purbeck marble columns. It has been filled with stained glass by Messrs. Hardman, of Birmingham, for the inhabitants of Worcester, as a testimonial of their respect and esteem for Dr. John Peel, Dean of Worcester.

The upper five lancets are filled with groups showing the divinity, power, and glory of our blessed Lord, of which "The Ascension" fills the centre large one. The other subjects, reading from base of dexter light, are—"The Annunciation," "The Adoration of Kings," "Presentation in the Temple," "Teaching in the Temple." 2nd. "The Baptism of our Lord," "Angels ministering to our Lord after the Temptation," "Transfiguration," "Stilling the Storm," "Preaching to the Apostles." 3rd. "The Resurrection," "Noli me tangere," "The Ascension," "Descent of the Holy Spirit," "Our Lord in Majesty." 4th. "Marriage Feast at Cana," "The Pool of Bethesda," "Feeding the Multitude," "Healing the Blind Man," "Cure of the Sick Man." 5th. "Raising Jairus's Daughter," "The Raising of Lazarus," "Raising the Widow's Son of Nairn," "The Centurion's Son healed." The lower lancets are filled with subjects from the passion and sufferings of our blessed Lord, of which "The Crucifixion" is the principal and centre one. The others are the following, reading from base of dexter light:—1st. "The Nativity," "Circumcision," "The Flight into Egypt," "The House at Nazareth." 2nd. "The Agony in the Garden," "The Betrayal," "The Denial of Peter," "The Mocking." 3rd. "Carriage of the Cross," "The Crucifixion," "The Entombment." 4th. "Before Herod," "Barrabas or Jesus," "The Scourging," "The Condemnation." 5th. "Casting of Jesus out of Nazareth," "Stoning in the Temple," "Weeping over Jerusalem,—'The Son of Man hath no where to lay his head.'" The subjects of the glass were designed by Mr. John Hardman Powell.

A printed paper put forth by the managers of the festival says correctly,—

"This venerable edifice abounds in examples of every style of ecclesiastical architecture, from the earliest Norman to the latest Perpendicular, of excellent composition and detail. The crypt, one of the finest examples of Early Norman work, has a beautiful eastern apsidal termination of peculiar interest, being one of the earliest, perhaps the earliest, specimen of that beautiful system of groining, radiating from central pillars, afterwards so perfectly developed in the fine Norman chapter-room, with its beautiful mural arcades and vaulting of variegated stone, all of which had till lately been hidden beneath an accumulation of plaster and whitewash. Several portions have been discovered, during the restorations, of the more ancient Norman Cathedral, the extent of which had hitherto been chiefly matter of conjecture: the recent discoveries have, however, served more clearly to define this. The two western bays of the nave are exceedingly fine specimens of the later Norman work, containing specimens of very peculiar ornamentation." "The whole of the nave, with the exception of the western bays and some few other parts, is a fine composition of the Decorated period, and together with the two great transepts, which contain portions of fine Norman and Perpendicular work, has been thoroughly freed from whitewash, and restored and opened to view in its ancient state. The whole fabric appears to have fallen at an early period into a state of decay, and to have suffered much from the hand of violence, and not less, perhaps, in some cases from the injudicious and ineffectual attempts at repair, by which much of its external architecture was defaced or destroyed, and the interior much mutilated and hidden from view. In the year 1855 it was found that the ordinary annual repairs were insufficient for the preservation of the fabric, and that the accumulation of decay rendered it necessary that a thorough repair should at once be undertaken. To effect this, and as far as possible to bring about a complete restoration of their Cathedral to its pristine beauty, the Dean and Chapter, by their own unassisted efforts, began the extensive works which have been in progress since that time under the direction of the Cathedral architect, Mr. Perkins."

In carrying out these works, it has been found necessary to remove some monuments, and the removal of Bishop Maddox's cenotaph in the great cross aisle has opened a Norman arch, which is probably a portion of the structure raised by St. Wulstan. It is rather curious that in further prosecuting these works a second Norman arch has been discovered, in the corresponding position, on the north side of the great cross aisle, behind the famous monument, by Roubiliac, of another Worcester bishop (Hough). This is built up into a solid wall, like the arch now open in the south aisle; and a suggestion has been made for opening this, and removing Roubiliac's work to another position.



THE CHOIR OF WORCESTER CATHEDRAL.—ARCHITECT IN THE RESTORATION, MR. A. E. PERKINS.

ARCHITECTURAL PHOTOGRAPHIC ASSOCIATION.

WE have before us the photographs, twenty-two in number, which have been taken, by order of the committee, for this year's issue. From these, which are obtainable only by members of the Association, subscribers of one guinea are entitled to select ten, and subscribers of two guineas, twenty. The subjects are taken from the Church of St. Trophime, Arles; Auxerre Cathedral; Bourges Cathedral; St. Gilles Abbey Church; Archbishop's Palace, Lyons; Sens Cathedral; Church of St. Martha, Tarascon; and the Abbey Church, Vezelay. The majority of them are portals of Romanesque character, very interesting and valuable. As photographs, some of them might be better. We can praise, however, even in this respect, the north door of the west portal of St. Gilles; west portal of Sens Cathedral; salle synodale of the same building; the south portal of St. Martha, Tarascon; and the west portal of Vezelay Church. We can fairly recommend our readers to join the Society at once.

Subscriptions may be paid to Mr. William Lightly, who acts as hon. secretary, 23, Bedford-row.

THE CLOSE COURTS IN LIVERPOOL.

ATTENTION is now being urgently called to those plague spots which have long given Liverpool a bad notoriety among English towns, and have been the main source of that unhealthiness for which this town has been noted; and although it is locally maintained that the town is not now an unhealthy one, and although no doubt great improvement in that respect has of late years been effected; still there are spots here and there which are as bad as ever, if not increasingly worse than when less densely populated. In the local council, lately, one of the aldermen admitted that "there are courts in this town which are never without fever, winter or summer." This remark has produced some impression; and "a gentleman of wealth and influence in the town" has written to the mayor, making the following offer:—

"With a view of promptly commencing to alleviate this misery, I beg that you will count on me for 1,000*l.* (only, however, on the terms mentioned at the foot of this letter), in the earnest hope that you may, before the close of your year of office, originate a voluntary committee having the management of a fund, raised by subscriptions, for the express purpose of buying up and obliterating these plague spots of our town.....

Thus, a few thousand pounds in the hands of a voluntary committee would go a long way; especially as many owners of property might part with it more easily to private persons than to the corporation. Perhaps a voluntary subscription will never buy up *all* the ill-constructed courts; yet we may reckon that those in which fever continually reigns can only be a small proportion of the mal-constructed ones; and this limited number might soon be purchased by the managers of such a voluntary fund, aided, perhaps, by the resale of the cleared land to the Finance Committee.

In many cases, where the rear of the court is wide enough, instead of purchasing the whole, it would be sufficient to remove one house, forming, as it were, the 'cork' to the court; and this ought to cost a mere trifle, as its removal would enhance the value of the houses behind.

If such a voluntary movement lead to an Act of Parliament for the compulsory removal of all such courts from Liverpool, so much the better."

The conditions on which the offer is made are these:—

100*l.* to be paid at once if the fund be originated on or before the 9th October next.

The remaining 900*l.* to be paid in the proportion of 100*l.* to every 10,000*l.* after the first 10,000*l.* that shall be actually raised before the 9th September, 1864.

The offer sounds liberal; but it will require a good many equally liberal subscribers to render such an offer of any really practical and efficient use.

PREMIUMS FOR DESIGNS FOR COTTAGES.

TWO prizes of 25*l.* each have been placed in the hands of the council of the Society of Arts, to which is added the Society's medal, to be offered for the most approved designs for cottages, with three bedrooms in each, to be built singly or in pairs, at a cost not exceeding 100*l.* each.

They are offered, one for competition among the members of the Architectural Association, and the other to be open to the United Kingdom.

In order to secure a proper sanitary condition, such provisions are to be made as have the sanction of practical experience.

"It is deemed necessary that each cottage should contain, on the ground-floor, a living room, of about 150 feet superficial; a scullery, or kitchen, of not less than 70 feet superficial, with a ventilated pantry; and, on the upper floor, three bedrooms, one of which must not be less than 100 feet superficial: in two of the bedrooms fireplaces should be provided. The height from ground to first-floor should be 9 feet, and the bedroom, or upper floor, be 8 feet clear.

The memorandum of the Inclosure Commissioners with respect to the substantiality of agricultural buildings (as applied by them under the several Improvement Acts), shall be adhered to.*

The drawings are to be on a uniform scale of one-eighth of an inch to a foot, and they are to be not fewer than six in number, viz.—two plans, three elevations, and one section.

Each design is to be accompanied by a detailed specification, and an estimate stating in full the quantities of all the materials required, and the *cost* price at which they are calculated. Brickwork at 8*l.* per rod reduced; countess slates at 23*s.*; and Baltic pine timber at 2*s.* 3*d.* per foot cube. In regard to other materials and labour the whole are to be calculated at cost price. An allowance of 20 per cent. is to be made for contingencies and builder's profit, with 5 per cent. for the cost of superintendence, so that the *prime cost* of each house must not exceed 80*l.*, which amount must include not only the cottage but the fixtures, water supply or well, fencing, paving, and all those necessary addenda which the cottage owner must provide, and which, costing money to provide, he requires interest for in the shape of rent."

In the selection of the plans for premiums, experienced professional assistance will be obtained, and the estimates will be subject to the examination of a competent surveyor. The designs will be submitted to public inspection, if deemed worthy thereof, and the two most approved will be retained for publication or not, at the option of the council.

The judges will be an architect, a land agent, and a builder, named by the council of the Society of Arts.

It would be an advantage if each competitor could name a contractor who would undertake the erection of ten pairs of cottages, according to the design and estimate.

The plans, drawings, and specifications must be sent to the Society's House, John-street, Adelphi, not later than the 1st of January, 1864.

ST. PETER'S PRIMITIVE METHODIST CHAPEL, CAMBRIDGE.

THE following were the tenders; Mr. Christmas, of Cottenham, architect:—

	For the Work according to the Drawings.	If the Chapel be 2 feet longer than the drawings, add.
	£ s. d.	£ s. d.
Bullock, Cambridge	748 0 0	—
Harvey, ditto	695 0 0	25 0 0
J. Oates, ditto.....	655 0 0	39 0 0
Christmas, Cottenham, the architect (accepted)	539 0 0	7 0 0

Thus Mr. Christmas is in the anomalous position of architect and builder. We hear that he intends to appoint a clerk of works on his behalf as architect, to see that he as builder does justice to his own design as architect: it is not clear, however, whether the architect is to look after the clerk of works, or whether the builder is to look after both.

TELBIN'S DIORAMA OF THE HOLY LAND.

THE pictures painted by Mr. Wm. Telbin, and exhibited in a piece produced at the Haymarket Theatre, are now shown at the Egyptian Hall, with some additional views, chiefly in the form of the moving diorama. There are seventeen subjects, including Cairo, Philœ, Jerusalem, the Holy Sepulchre, Ford of the Jordan, Plain of Jericho, the Dead Sea, Nazareth, Galilee, Mount Hermon, Distant View of Damascus, Interior of a Turk's House, Bäalbec, Beyrout, Street in Smyrna, Constantinople, and Entrance to the Bosphorus. The greater number of the subjects are as finely painted as anything that has come from Mr. Telbin's hand, and certain effects of light are well managed. In the exhibition of the view of the interior of the Church of the Holy Sepulchre, one of the best of the number, the sepulchre opens, and discloses the body of the Saviour, the head supported by angels,—a beautiful piece of effect. The details of architecture in the Bäalbec view are not sufficiently made out. The statement in the description that the Great Temple of the Sun is supposed to have been built by Solomon, should be corrected, or supplemented, to the extent of saying that the existing remains are undoubted Late Roman. This, the mouldings and ornamentation are quite sufficient to show. There is one omission, common in the lectures accompanying such exhibitions as the one we are noticing, and not compensated by any amount of sounding words. The lecturer does not point out, with sufficient clearness for his audience to discover, the separate buildings or other objects of which he speaks, or which are included in the picture. The enterprise which prompted Mr. Telbin's journey to the Holy Land for the purpose of obtaining faithful representations, the supreme interest of the places shown, and the skill and power which the pictures display, make a strong claim on public attention. Vocal music is added to the attractions of the exhibition.

* This may be obtained at the Society's house.

HOW TO PREVENT THE TRANSMISSION OF SOUND THROUGH GLASS.

A CORRESPONDENT asks in the *Builder* how sound is to be prevented passing through a plate-glass partition. "Civil Engineer" says,—The answer is, Have two plates with an air-space betwixt. An ordinary window may be glazed with double "sheets" or "squares" of glass; and if an air-space of ¼ inch is left betwixt each sheet or square of glass, sound will be deadened, and heat be retained. Mr. Bridges Adams has, I think, proposed "double windows," as described; that is, ordinary window-sashes with double glass, having ⅜ inch or ½ inch air-space betwixt each square of glass. Ordinary windows in offices or street-fronts will be warmer, and deaden the sound, if so glazed.

ARCHITECTS AND BUILDERS.

SHOREDITCH WORKHOUSE.

"AN Architect," who sends us a local paper containing a report of a recent meeting of the Board of Guardians of Shoreditch, draws our attention to a statement (as reported by one of the speakers) of the architect of the workhouse which is being built for that parish, tending to discredit the architectural profession. It had been objected that in a contract of 43,000*l.* the sum of 7,000*l.* is left at the disposal of the architect, Mr. W. Lee, without control, for engineering and other works. The architect satisfied the board, and the objection was withdrawn; but the statement made by him rankles in the mind of some of our readers. What the architect's defender said was this:—

"*He had made it his business to consult Mr. Lee upon this question, and asked him whether it was an expected thing with professional men to get a profit out of these things? He said, 'Yes; it is usual.' He said, 'Now, Mr. Lee, do you mention that in confidence, or can I make any use of it?' He said, 'Yes; you can make any use you please of it.'*"

We should like to know on what grounds Mr. Lee makes this assertion?

BUCKLAND ST. MARY, SOMERSET.

THE Church of Buckland St. Mary, which has been entirely rebuilt, at nearly the sole cost of the rector, the Rev. J. E. Lance, has been consecrated and opened for divine service, by the Bishop of Bath and Wells. Through the lapse of years the old church had become much dilapidated, and almost unfit for the purpose of religious worship; and its condition was long a subject of serious anxiety to the rector. At length he came to the resolve to rebuild the church at his own expense; but he was joined in the work by the parish, and friends and relations. Notwithstanding this assistance, however, the rector is said to have expended 16,000*l.* on the church, the total cost of rebuilding being 20,000*l.* The new church of St. Mary Buckland is built in the Second Pointed style of the later floriated character. The building has been several years in progress, it being the desire of its founder that every part of it should be built as solidly as possible and of the best materials. The plan of the church consists of a nave, north and south aisles, with a tower at the south-west end, a south porch, a chancel with side chapels, the south appropriated as a vestry. The nave may be said to consist of five bays, and is separated from the north and south aisles by an arcade of clustered columns and deeply-moulded arches. Over the apex of the arches are placed twelve canopied niches, each niche containing a statue of an apostle. In the gable wall over the arch is an elaborate niche, with a statue of our Lord. The whole of the statues were provided by Mr. Earp, of London. The roofs, both to the nave and aisles, are of oak. The former has moulded and arched trusses resting on hammer beams; the latter moulded trusses on carved brackets and divided into panels by moulded ribs. The west end of the nave has a six-light window, filled with painted glass, executed by Messrs. Clayton & Bell. The aisle windows are ornamented by painted glass, by Messrs. O'Connor and others. The chancel roof has much carving,

enriched by polychromy, the work of Mr. A. Stansell, of Taunton. The vestry on the south side and the north chapel are separated by wrought stone screens, with enriched cornices, shafts, and decorated tracery work. The chancel is separated from the nave by a low arcaded stone screen of different coloured materials, and the little pillars composed of stones and marbles, the productions of Somerset, and other details, are executed in green and other marbles. In the centre is an opening, to which are hung brass gates, with cinquefoil tracery and other ornaments. Combined with this screen stands the pulpit, on the north side approached from the chancel. This, again, is composed of Ham stone, inlaid with various marbles, the body of the pulpit being supported upon a large central column surrounded by smaller pillars of coloured marble, with carved capitals of white lias—all these materials from the county. There are five deeply-recessed arches, containing figures of the four evangelists, our Lord occupying the centre one. The east end of the chancel has a traceried five-light window, filled with painted glass, by Messrs. O'Connor. In the east window, the lower compartment represents the sufferings and crucifixion of Jesus. The upper division represents Jesus on His throne of glory, surrounded by glorified saints. The north window represents the resurrection; the south, the ascension. The window in the north transept is by Messrs. Powell, and represents four subjects;—Abraham offering up Isaac; Jesus in subjection to his parents, and reasoning with the doctors; and Hannah presenting Samuel to the Lord. All the remaining windows are by Messrs. Clayton & Bell. That in the tower represents the passage of the Red Sea, and the plagues. In the west window is a representation of the Day of Judgment. On the north side of the west end of the nave are two windows filled with stained glass. One is a one-light window, the subject of which is the Baptism of our Lord, and the other, a two-light window, the subject represented being the Entering into the Ark. In the north aisle is a mercy window, with subjects from St. Matt. xxv. Below the east window is a sculptured reredos, filled with arcaded and inlaid work of Derbyshire and Watchet alabaster, the centre panel of white alabaster, with gold metal cross. In the north side of the sanctuary there is placed a mural recessed segmental arch, having deeply-sunk mouldings, consisting of a memorial of the Rev. Mr. Lance's first wife. The coped gravestone is bursting asunder for a final resurrection. The artist was Mr. Forsyth. The chancel is furnished with oak stalls, the front and ends being carved. The chancel is paved with encaustic tiling. The aisles are filled with solid benches, the ends panelled, traceried, and carved. The nave is fitted with loose benches of oak. The western tower communicates with the nave by a segmental arch. Opposite the entrance stands the font, made of native stones and marble. It is octagonal in shape, the bowl being made of Williton sandstone, and in the alternate sides are inserted, in medallions, figures of the four evangelists, the other sides containing representations of the baptism of the eunuch by Philip, the baptism of Christ by St. John, Christ's rebuke to those who kept back little children from approaching him, and Christ's charge to his apostles to go into all the world, &c. This is supported by columns of Somerset marble from the Quantock Hills, and the capitals are of Watchet alabaster. The whole rests upon a stand of polished lias. It is surmounted by a carved and canopied cover of oak, made from the old oak of the former church. The font is the gift of Mr. H. Davis, of Taunton, by whom the entire church has been built. The tower stands at the west end of the south aisle, and has an entrance from the west. The interior is groined with stone, and contains a four-light window filled with stained glass. In the upper stage is a peal of six bells. The tower is strengthened by graduated buttresses, and terminates with an enriched parapet and pyramidal roof. There is also a south porch, groined with stone. Inside the south door is a canopied niche, which contains a figure of the patron saint of the church. The span roofs of the nave and chancel, as well as the lean-to roofs of the aisles, are covered with Bridgwater tiles. The church is built of Ham Hill stone dressings, and flint facings. The entire building was designed by Mr. Ferrey, the diocesan architect; and the work has been executed by Mr. H. Davis, of Taunton, who recently re-built the tower of St. Mary's Church, Taunton. The organ, which is placed in the north chapel, has been built by Mr. W. Sweetland, of Bath. The great organ (CCC to F, 54 notes) contains the following stops:—open diapason, stop diapason (treble and bass), dulciana, principal, twelfth, fifteenth, German flute. The swell (tenor C to F) contains:—open diapason, dulciana, stop diapason, principal, fifteenth, hautboy, and trumpet, inclosed in a Venetian swell constructed on a new principle. There are also pedal organ, CCC to C; open diapason from CCC to F, and three composition pedals. There is a metal pipe front.

CHURCH-BUILDING NEWS.

Chew Stoke (*Somerset*).—The parish church of St. Andrew, Chew Stoke, after undergoing a restoration, has been re-opened for divine service. The old edifice, which was in a very dilapidated state, consisted of a chancel, nave, and south aisle; but a north aisle and north chancel chapel have been added. The tower has been preserved, and the new work made to harmonise with it. Interiorly the south arcade is of the thirteenth century, as is also the east window; but other portions indicate the fourteenth century period; and instead of designing the alterations all in one style, the old features have been retained. The church, therefore, as restored, represents three periods of Gothic architecture. The south aisle is said to have been rebuilt, stone for stone, according to the old design; but the north aisle has been built in the same style as the tower, and is divided from the nave by an arcade of clustered columns with friezes of angels for capitals. The north chancel chapel, in continuation of the aisle, is divided into an organ chamber and vestry by means of screens; and the chancel itself is separated from this chapel and the south chapel by par-closed screens. The fittings and roofs are all new. The pulpit, which is octagonal and in the Decorated character, is sculptured and inlaid with marble; and the same may be said of the reredos under the east chancel window, which is inlaid with coloured marbles, and is to be elaborately ornamented. The east window represents incidents in the life of St. Andrew, the patron saint of the church, and was executed by Mr. Bell, of Bristol. It was the special gift of the rector, the Rev. W. P. Wait. The stone font, which is made to agree with the Early English work of the church, was given by Mrs. F. Durke, the wife of the contractor. The font stands at the west end of the church under the tower, which forms a baptistry. On removing the gallery which formerly blocked up this portion of the church, a groined ceiling to the tower, and which is now exposed to view, was discovered. The chancel floor is inlaid with Minton's and Mawe's tiles. The roof is of open timber, stained and varnished, with carved angels at the cornices, and the seats are also of stained wood, with carved *fleur de lis* ends. The old church could accommodate 239 persons, including the west-end gallery, which blocked up the tower; but now it will accommodate, without the gallery, 318, and the larger portion of the seats are free and unappropriated. The churchyard has been levelled. The old organ has been restored by Mr. Vowles, of Bristol, and now stands at the north of the chancel. There is a south porch, with open pierced parapet work, and battlement cornices to the nave and aisles throughout. Underneath the church is a heating chamber, containing an apparatus of Mr. Aden, of Trowbridge. It was not intended at first to effect so complete a restoration in the edifice as has been done; but as the work progressed the old building was found to be so dilapidated that sweeping improvements were required. The whole of the alterations were designed by Mr. J. Norton, of London and Bristol, architect, the contractor being Mr. F. Durke, of Chew Stoke.

Nantddu.—The church recently built in this place has been opened for divine service by the Bishop of St. David's. The church is situate in a valley that has great attractions to the people of Merthyr. The edifice was designed by Mr. Buckridge, of Oxford; and the builder was Mr. W. Williams, of Brecon. The cost was 400*l*.

Llanfihangel (*Brecon*).—The committee for the restoration of Llanfihangel Fechan Church have received the undermentioned tenders, according to the plans and specifications prepared by Mr. T. Nicholson, of Hereford, architect:—Mr. W. Williams, builder, Watton, 531*l*.; Mr. R. Price, builder, Llanfaes, 528*l*.; Messrs. Williams & Sons, Llanfaes, 480*l*. The last-named was accepted. The building of Christ College, which is rapidly drawing to a close, and the old Christ College Church, which is about being restored, are both under the superintendence of Messrs. Williams & Sons.

Shrewsbury.—The works at Shrewsbury Abbey Church are now brought to an end. These comprise the re-establishment of the structural parts of the edifice, the restoration, so to say, of much of its foundation, and under-pinning. Some centuries ago, the ancient Norman clerestory had been destroyed, and the roof lowered to the level of the triforium arcade. Want of funds determined the committee not to attempt to replace this clerestory, or restore the transepts and part of the choir, as at first proposed. The lighting of the interior has been obtained by opening the triforium arcade, and fitting it in accordance with the character of that part of the structure, and in something like harmony with the western and later parts of the building. The gallery that filled up the interior tower base, with the cumbrous organ it supported, has been removed, and the windows on the side of the town, as being of good proportions, have been opened. Thus, the great west window is now displaced. Some farther details will be found on p. 572, *ante*.

Wilmslow (*Cheshire*). — The ancient parish church of Wilmslow, dedicated to St. Bartholomew, has been re-opened for divine service. Considerable repairs and alterations have been made, at a cost exceeding 3,000*l*. An addition has been made to the churchyard, at a further cost exceeding 1,000*l*. A transept has been added to the church, and also a gallery for Sunday-school children. The pews have been removed, and their place supplied by open sittings.

PROVINCIAL NEWS.

Peterborough.—The cattle market project is progressing, and operations, it is said, will be commenced shortly after Michaelmas. The plan has been prepared by Mr. T. C. Thorburn, the architect of the Derby cattle market, and approved by the directors. The stalls are to accommodate 825 store beasts, 685 fat, 104 calves, 4,448 sheep and lambs, 520 pigs, and 145 horses. The area of the land is about 5½ acres.

Haileybury (*Herts*).—The council of Haileybury College (which was formerly the East-India Company's Cadet College) are now having waterworks erected for the supply of their extensive establishment. The supply is from a deep well sunk into the chalk, whence springs an unlimited quantity of water of the purest quality. The water will be pumped into a tank holding 10,000 gallons, erected on a tower 234 feet above the water-level. The works include a high-pressure steam-engine, Cornish boiler, pumps, and other work, and will supply 4,000 gallons per hour. The swimming-bath, lately erected, will require 235,000 gallons of water, and is one of the largest in England, being 210 feet long. Mr. Josiah F. Fairbank, C.E., designed these works, and is entrusted with the execution of them.

Buckingham.—The council having issued notice for tenders for a new iron foot-bridge in lieu of the present wooden and unsafe one near the Woolpack Inn, the one sent in by Mr. Wright, of Stamford, was chosen, the cost being 90*l*. The bridge is to be constructed of wrought iron, and to be of 32 feet span. The abutments, &c., will have to be completed under a separate tender. The council received plans and tenders from eight different firms.

Aldershott. — The Mission-hall and Soldiers' Institute, the first stone of which was laid on the 11th of February by the Earl of Shaftesbury, was to be formally opened on the 4th. The building is in the Early Anglo-Gothic style, and is furnished with a reading-room, smoking-room, library, coffee-bar, and other offices, together with a lecture-hall, capable of accommodating 500 persons. The architects are Messrs. Eggar & Stapley, of Farnham, and the builders Messrs. Goddard, of the same place. The object of the Mission-hall is to furnish the soldier with wholesome means of recreation in place of the vitiating temptations which exist at Aldershott. Amusements will be provided, and occasional lectures on interesting subjects will be given.

THE MAIN DRAINAGE AND SUBURBAN GARDENS.

MR. GLENNEY complains of the ill effect of the deep cutting of the Main Drainage on the market and other gardens which surround London. He tells us that many wells and other sources of water-supply have been dried up, and that the moisture has been so much absorbed from the soil that trees, plants, &c., lack nourishment, and suffer severely. Mr. Glenney's opinions on subjects of this nature are well worthy of consideration; but it should be borne in mind that this summer

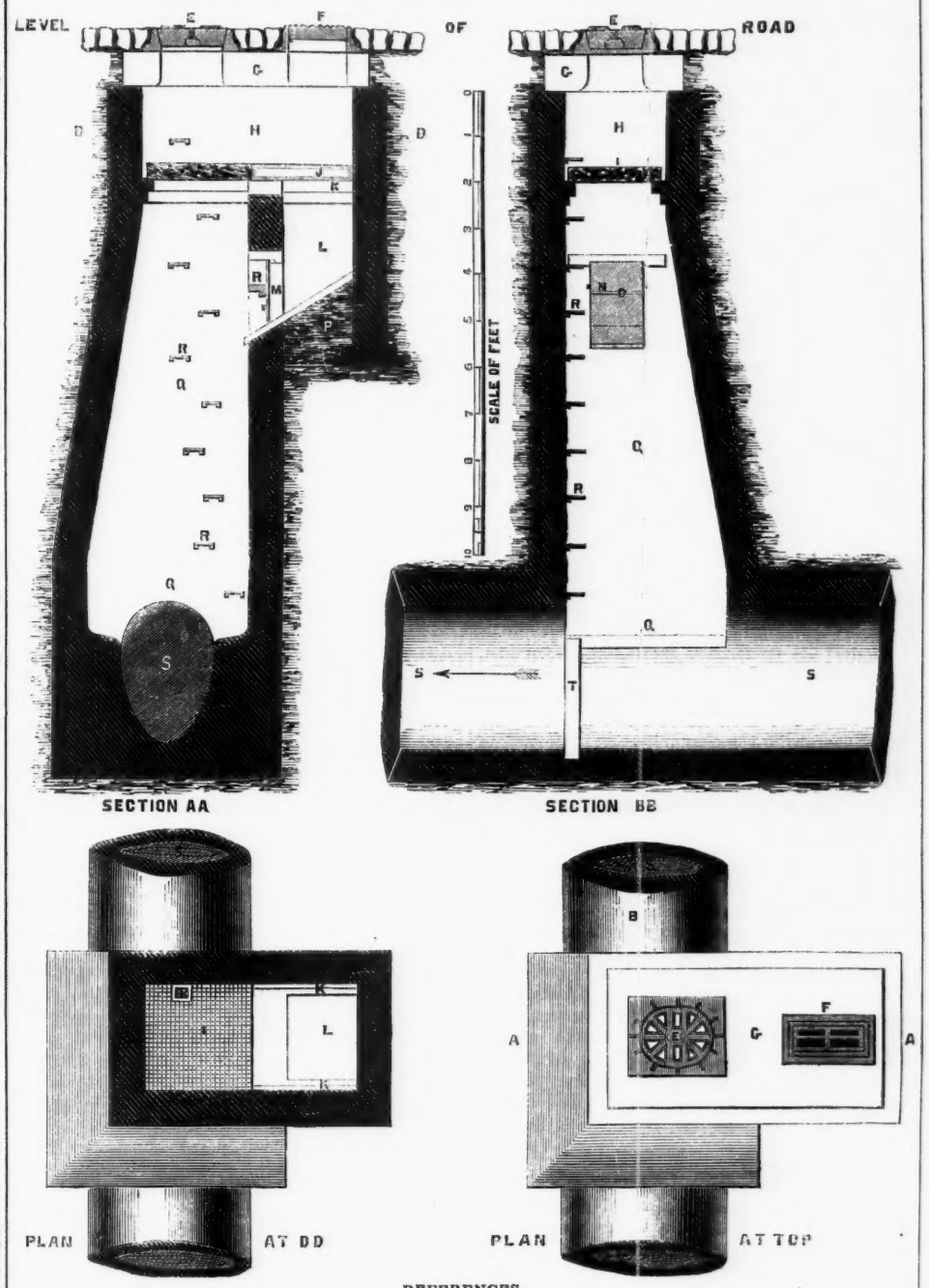
has been one remarkable for the small extent of rain-fall; and it may be, that what is complained of is but temporary: but in one respect we should not regret this drying of the soil, which, if other things are well managed, is in great cities conducive to health. This gentleman does not approve, except in cases of extremity, the watering of flowers and plants upon the surface; but when we notice that pipe drainage of both fields and gardens has had a most beneficial effect, and that the rain descends from heaven and waters the earth, it seems natural that some plan of irrigation—different from that at present in use—may be applied with success in the preservation of the beauty and usefulness of our parks, gardens, &c. It will be said that the cost of water in the metropolis would prevent the application of this to any sufficient extent; but it is not likely that London can be supplied with this necessary in the same manner as at present, but that ere long we will have new supplies, from distant and pure sources of water, without limit. The Main Drainage being completed, it is not unlikely that the public attention will be directed to this most important matter.

MAIN SEWER VENTILATION.

IN the construction of main sewers it is of the utmost importance to provide for full, free, and unceasing ventilation at many points; and also, as far as is possible, to *disinfect* sewage gases before these escape into the street above the sewer. Some twenty or more years since the London sewers were, for the first time, extensively and permanently ventilated, with, it must be confessed, great sanitary advantages to the residents in the metropolis. The London sewers are, however, unfortunately for the most part ventilated by vertical shafts *direct* from the sewer to the street; the ventilating grates allowing sewage gases to escape direct into the open air above; street mud, ground macadam, sticks, straw, and any other material which will pass through the open spaces of the ventilating grate, falling down and tending to block the flow of sewage below. Some years since Dr. John Stenhouse proposed the use of charcoal as a disinfecting medium for sewage gases. Mr. Robert Rawlinson, sanitary commissioner in 1855, adopted charcoal at the suggestion of Dr. Stenhouse, in the British Hospitals on the Bosphorus, as also in the Crimea, and, subsequently, in various towns in England on main sewers; as, at Worksop, at West Ham, at Brighton, at Winchester, at Windsor Castle, at Swansea, and at other places. Dr. Letheby, the City Officer of Health, and Mr. Wm. Haywood, the city engineer, have also used Dr. Stenhouse's mode of applying charcoal to disinfect sewage gases in the City sewers; and, as reported by these gentlemen, with advantage. There are difficulties on the City sewers peculiar to the City of London. The volume of sewage is vast, and the sewers are large, having flat inverts, with small falls. They have also to be cleansed by hand labour; any check, therefore, to the free flow of air to and from the sewers, to dilute the sewage gases, is attended with some danger, and the intervening of screens of fine charcoal *might* retard ventilation in a degree. The remedy is, however, to be found, not in abandoning a use of charcoal, which is so beneficial, but by increasing the area for ventilation, so as to compensate for any retardation of an escape of sewage gases by the ordinary openings. The following facts have been proved:—Ordinary wood charcoal, broken small in grains like coffee beans, and placed in wire boxes, or trays, so as to "*screen*" the sewage gases, oxydises such gases as they pass through the charcoal. This effect is not evanescent, but is permanent, in a great degree. The charcoal abstracts oxygen from the atmosphere by its enormous area of pores, and combines this oxygen with the sewage gases in such manner as to produce a sort of slow combustion, or such recombination, as to render sewage gases comparatively innocent. Dilution in the air has a similar effect, but is not so rapid.

In main sewer ventilation, charcoal can be used at all ordinary manholes, as shown on the diagram, plans, and sections. A manhole-cover is placed over the vertical shaft above the sewer, which forms the street surface, and is air-tight, but moveable. A side chamber is formed, over which to place the open ventilating grate, and a wire tray, to be filled 3, 4, or more inches deep with fine charcoal, is so placed that it will slide over the vertical shaft, and so cause all gases escaping from the sewer to pass through the charcoal when in action. The tray can be drawn or pushed back over the side chamber when it is desirable to enter the sewer to examine, to cleanse, or to flush it. Such ventilating chambers, at some 300 feet to 500 feet intervals, are in use on the main sewers in West Ham, and in other places. The side-chamber is an advantageous arrangement, if there be no charcoal tray, in preventing dirt falling upon the sewer invert, and so impeding the sewage flow.

VENTILATION OF MAIN SEWERAGE.——*Mr. R. Rawlinson, C.E.*



REFERENCES.

EEE. Manhole Cover.	KKK. Iron Bars.	P. Concrete.
FF. Ventilating Grate.	LL. Receptacle for Road Grit.	QQQQ. Manhole Shaft.
GGG. Stone Cover.	M. Opening for removal of Road Grit	RRRR. Step Irons.
HH. Ventilating Chamber.	NN. Iron Door.	SSSSS. Brick Sewer.
II. Charcoal Screen.	O. Iron Bar to fasten Door.	T. Slot to receive Sluice.
J. Position of Screen when removed.		

THE SANITARY STATE OF OUR TOWNS.

THE Privy Council having sent down Mr. Bristow to Whitehaven to make a sanitary inspection of the town, he attended a meeting of the sub-committee of the Board of Health, and in the course of his remarks on the filthy state of the town, part of which he had then visited, he referred to the report made on the town thirteen years ago by Mr. Rawlinson, whose recommendations as regarded waterworks and the burial of the dead outside the town had been carried out, but in other respects the town had remained till now in precisely the same state as then. Many things, he remarked, could be done under the Local Government Act, if they had the co-operation of the local magistracy; and the Nuisances Removal Act would enable the local authority to remove nuisances, and to compel whitewashing.——Small-pox, it appears, is still spreading at Keswick, and cleansing processes and vaccination there are still the order of the day. Dr. Leitch, a local medical authority, states that there has been a gradually increasing mortality for many years in Keswick, showing that there must be some special cause of death at work, and in his belief the increased mortality is due to the circumstance that the old imperfect drains are unfitted to carry the refuse of water-closets and cesspools, which have gone on increasing during the last ten years. Mr. Rawlinson, in a letter to him, expresses his indignation that ignorance and prejudice should so long continue to oppose effectual measures for restoring Keswick to a more healthy state: he says that main sewers might be got for a 6d. rate.——At Edzell, in Scotland, lately, Professor Miller, at the close of a lecture, urged that this village should be thoroughly drained; and the Earl of Dalhousie, while passing through to Dundee, has intimated to Professor Miller that he will be at the whole expense of putting in the main or leading drain in the village, and carrying it down to the river North Esk.

NATIONAL ASSOCIATION FOR THE PROMOTION OF SOCIAL SCIENCE.—The seventh annual meeting will be held in Edinburgh, commencing Wednesday, 7th of October, under the presidency of Lord Brougham.

THE CONSERVATION OF NAVIGABLE RIVERS.

AT the recent meeting of the British Association for the Advancement of Science, at Newcastle-upon-Tyne, in the Mechanical Section, Mr. J. F. Ure, engineer to the River Tyne Commissioners, read a long and interesting paper on the several methods adopted towards improving the navigation of the river.

In the discussion, Mr. J. Scott Russell quite agreed with the plan at present being adopted by Mr. Ure for the improvement of the river, but thought Mr. Ure had rather understated than overstated the advantages that might be expected as resulting from an improved depth of water in the river. Having been connected for about forty years with the Clyde, he well remembered the revolution that had been produced there, and he remembered when only a few fishing-boats could get to the quays, and also when he went down with great wonder to see the first two-masted ships come up to the quays at Glasgow; they had now from 16 to 20 feet of water, and all this had been accomplished by the same system now being adopted on the Tyne—namely, by dredging. He congratulated them upon the fact that instead of taking the little-and-little-bit plan, they had had the courage to apply at once the most modern principle with which they were acquainted. They were going to encourage the tidal wave to come in by giving it great depth, uniformity of channel, and great widening to the mouth of the sea.

Admiral Sir E. Belcher totally disagreed with Mr. Ure as to the plan adopted by him, and quoted the Clyde, as showing that the improvements there had been effected not by dredging, but by narrowing the channel.

On another day Mr. Ure conducted a party down the river. The works comprise piers at the mouth of the river, which will cost 660,000*l.*, and inner works estimated to cost 950,000*l.* The dredging plant is said to be worth 250,000*l.*: it includes two of the most powerful dredging-machines in the world, lifting three millions of yards of sand from the river-bed in one year.

We may remark that the reports do not convey quite a clear impression of the arrangements at the mouth of the Tyne, designed by Mr. Walker, so far as the piers tending to narrow the mouth are concerned. These arrangements, it has been said by some engineers, tend to produce silting up of the river, although no doubt the dredging would at least retard that operation.

MEETING OF THE NOTTINGHAM ARCHITECTURAL SOCIETY IN LICHFIELD.

ON Monday, the 17th ultimo, the members of this society, accompanied by their president, Mr. T. C. Hine, held their annual excursion meeting at the cathedral town of Lichfield. The following members and associates were present:—Mr. T. C. Hine, president; Messrs. Jalland, Gilbert, Clarke, Norris, Evans, John Jackson, Heazell, S. D. Walker, Hickson, F. Booker, R. Booker, G. F. Hine, R. C. Clarke, Ingle, and G. Hickson, with Mr. Frederick Jackson, the honorary secretary. The party devoted a large portion of the day to the examination of the cathedral, and visited other places of interest. Amongst them was Dr. Johnson's house. This house, at the corner of Sadler-street, still presents its ancient front, but has degenerated into a draper's shop: fronting it is an unworthy statue of the doctor himself, supposed to be in deep meditation; and near the Market-house, Edward VI.'s grammar-school, in which Johnson was trained, as were Addison, Garrick, Bishop Newton; Salt, the Egyptian traveller; and other eminent men. The doctor was wont to say that Dr. Hunter never taught a boy in his life: *he* whipped and *they* learned. In the castle, on the site of which are erected the Newton almshouses, Richard II. was confined. The neighbourhood is somewhat rich in antiquities. Amongst these is Edial, or Edgehill, an old high-roofed house where Johnson lived in 1736, when Garrick was his pupil; and at Stow Hill he wrote the greater part of his "Lives of the Poets." A Roman station, called Etocetum, was supposed to be here, from which the town is said to have taken its name. A number of martyrs suffered under the Romans, in a field close to the station, in the third century. Lich being the Saxon for dead body, hence the name Lichfield.

The restorations in the cathedral, our readers know, include a new chancel floor of illuminated and glazed mosaic work; the carved oak throne, with the dean, chapter, and choir sedilia, by Evans; a reredos, commenced,—to cost, it is said, 3,000*l.*; and the chancel screen, in brass, copper, and iron, richly coloured, a work worthy of comparison with its sister screen, made for Hereford cathedral. It is to be regretted that the screen was not confined to the space between the clustered piers of the chancel arch. The stonework has been somewhat defaced and hidden from view by the metal work extending beyond the space before named.

ACCIDENTS.

HEMBRIGG Mill, where a recent terrific boiler explosion occurred, is again the scene of a disaster. During a gale of wind the chimney has been blown down. It was about 25 yards high, and was built after the boiler explosion, two months ago, and only required the coping-stones at the top to complete it. It was erected on the site of the old chimney. Across two houses, one occupied by the owner, the chimney fell, and completely battered in the roofs and floors; and, though the buildings were three stories high, several loads of bricks and rubbish were deposited in the first story. The inmates had barely time to escape.

The roof and side wall of a foundry at Salford, Todmorden, have fallen in. The cause is supposed to be the drying of the timbers by the heat arising from moulding. Fortunately the building fell after work hours.

At the Ouseburn Engine Works, Newcastle-upon-Tyne, while stripping an immense casting, it was found necessary to shift its position, and a traversing crane was employed for the purpose. While this operation was being performed, one of the iron girders on which the crane travelled gave way, it is supposed, from the oblique strain brought to bear upon the coupling chain; and seven men were brought to the ground, one of whom was killed, and three others, were injured.

A number of workmen, in the employment of Mr. Thomas Davies, have been at work for some time past in the removal of several old cottages situate in Mill-street, Leominster, new ones having been erected. To serve the purposes of a workshop, and as a place for lime and other things, the workmen had left an old house standing in the rear of the new buildings; and this was covered with a very heavy roof of tile and stone. A week before, the workmen cut away the binder or tie which held the roof together, and to this act is attributed the circumstance that the building fell and killed one of the workmen. Verdict, "Accidental death."

The verdict on the bodies of the two men, killed by the falling in of a well in the course of being built at Woodbridge, was, "That the death of the deceased was caused by accident by the partly caving in of a well, arising from the deceased, Charles Dove, incautiously taking some bricks from one quarter of the well without properly securing the quarter from which those bricks were taken."

THE COLOURED DECORATIONS IN NEW STREET CHAPEL, YORK.

THE above decorations, which have just been brought to issue, have been completed under the superintendence of Mr. Worthington, of Blake-street. The design, though in some points open to exceptions, is on the whole very satisfactory. The walls of the chapel and orchestra are tinted a light cinnamon. A continuous painted band or label, in white and chocolate, is carried round the window arches, and connects them at their springings; the circular part being filled in with a Vitruvian scroll and the horizontal with a Doric fret, interrupted at intervals by a four-leaved flower. The ground-floor has a stiff maroon arabesque above the skirting, and a white honeysuckle ornament on gilt and chocolate grounds beneath a portion of the cornice. The gallery front remains in its old state, but the plastered cove immediately below it is filled in with upright patterns in pink and buff, the effect of which is not altogether satisfactory. The pews above and below are stained in imitation of oak. The design of a painted ceiling is often determined to a great extent beforehand by its panels, &c.; but in the present instance there was nothing to restrict the fancy of the artist except an internal moulding and the disposition of the ventilators. This arrangement is in the main simple and effective, and the general tone of the colouring very harmonious, and neither positively poor on the one hand nor unduly brilliant on the other. The groundwork tint is a light pink. The (quasi) panels are a grey azure, separated from their light buff margins by a running fret. Those around the large central ventilator are similarly treated, but the blue is deeper, and (like the semi-dome of the orchestra) diapered with gilt stars, and immediately bordered with bands of guilloche, &c., painted white and cholocate on a ground of rich orange buff. A light green margin, above a foot wide, runs round the whole of the ceiling close to the cornice, which is white picked out with gilding. The ventilators are surrounded by the interlacing pattern, in white and greenish buff, and exhibit a white flower on maroon ground, both being relieved with gilding. The walls to corridors are a light grey azure, the old skirtings of wood colour being retained. The tint in question may be very serviceable and durable, and form a very effective contrast, but surely this will not justify the treating of plaster like wood, the graining it as such, and above all, the carefnl imitation of the joints of carpentry.

YORK.

A GROWL AT THE PRESENT.

SIR,—After a recent walk through the City, I could not help making the following anything but consoling reflections. The recently-finished buildings one observes have certainly the merit of expressing the characteristic traits of the age, pretence and ostentation; and I know no reason why we should expect our architects to differ in any degree from their employers. Even in the last century the architecture still retained some of the good old English tradition; the good old brick houses retained in a slight degree that homeliness, that simplicity, that we have considered as our own, and handed down to us from the early middle ages. A glance at some of the old drawings of our Mediæval towns will at once explain my meaning; but now a cotton warehouse imitates, and that very badly, the palace of a Florentine noble; and a linseed broker must have a bad imitation of a Gothic palace on the grand canal at Venice; at other places is a nondescript style, invented for this peculiar age,—and the carving on it, I am told, is French Gothic in character: it certainly does not resemble any I ever saw: however, that is nought; but this I do know of it, that it is, in the vulgarity of its undercutting and snobbishness of its coarseness, quite worthy to decorate the dens where that money is made, to be spent afterwards in the sham of society or pettiness of life in the suburban villa, all of which life consists in trying to appear somewhat above its actual position in the social scale. Old hostelries —all things old—are going; not a sign on the part of the architect to retain in his new buildings one particle of dear old English tradition. French, Italian, Renaissance, German, but of English not a sign,—none of the sweet, dear, homely poetry of England's architecture. If we build a church it is French, a convent is Roman, an insurance-office is Renaissance, something else is Lombardian; whatever it is, there is one prevailing idea,—something large, coarse, showy, thick, clumsy, would be grand, but not an idea of any of the tradition of England's sweet poetic loveliness and littleness. England never aimed in olden times at grandeur: it left that to France and Italy: it sought in accordance with its landscape, its life, its poetry, a small sweet homeliness. We live in an age that hates willow-pattern plates, Dutch tiles, and everything else but show, money, and sin.

X. Y. Z.

ARCHITECT AND HOTEL KEEPER.

SIR,—I enclose you a copy of a circular sent round to the directors of the Bridlington Hotel Company, and would draw your attention to a new phase in the architectural world, viz.—a person styling himself "Hotel keeper and architect," thinking it might be advantageous to the profession to calculate the benefits that might arise from such a combination. Either hotel-keeping must be advancing in rank, or architecture must be on the decline.

P. W.

*** In the prospectus in question, the competitor calling himself architect makes it a claim for consideration of his drawings that he keeps an hotel himself.

"CARLISLE BRIDGE COMPETITION."

SIR,—Though a "non-expectant" in this matter, I cannot help expressing an opinion that sufficient time has elapsed since the drawings were sent in (May, 1862) for the committee to have come to some decision in the selection of a design. Their doing so would, at all events, allow the competitors who may be unsuccessful an opportunity of getting back their drawings, some of which, produced at no small expense and trouble, *must* receive considerable injury from dust and exposure in forming pictorial decorations for the walls of the Dublin council-chamber, which service, I understand, they are at present performing. If such injury do result, I am inclined to think that the committee can be held responsible, having detained the drawings for such a considerable time beyond what was reasonable and necessary for the purpose for which they were submitted to them.

Whether the committee have not money to pay the premiums, or whether, having the money, but not intending to carry out the work, it is hoped the matter

may die out and be forgotten, leaving them in possession of a gallery of engineering designs, I cannot pretend to say; but one or other of these conclusions would appear inevitable. "A NON-EXPECTANT."

*** The course which has been pursued is very discreditable to the committee. Some of the gentlemen forming it can scarcely have given the subject a thought, or a decision would long since have been come to.

Books Received.

Elementi di Architettura Gotica: Elements of Gothic Architecture. By COUNT EDOARDO MELLA. Vercelli: Guglielmoni, 1863. Two large folio volumes, with numerous plates.

COUNT MELLA, a professional architect, well known for his skilful and learned restoration of the cathedrals of Casale, Saluzzo, and Acqui, and who is now engaged in the erection of a new Basilica, on the model of those of the primitive ages, at Berghem, in Norway, has, after thirty years' studies and practice, published this work, which analyses, both practically and theoretically, the principles and laws which directed the erection of the Mediæval buildings throughout Europe. Count Mella has availed himself, for this purpose, not only of the various hints scattered through the writings of ancient authors, but also of the practical experience he has acquired in his travels through every part of Europe, during which he made a most complete collection of drawings of all its Gothic monuments. This archæological work has a mathematical character at the same time, and gives detailed drawings and specifications of even accessary constructions.

VARIORUM.

A DISCOVERY concerning Ghosts; with a Rap at the Spirit-rappers. By George Cruikshank. Arnold, 86, Fleet-street. In these days of so-called "spirit" manifestations, and "ghost" revivals, with a legion of mischievous though merely subjective "devils," as it were, let loose upon society, the good-humoured ridicule of the whole affair by George Cruikshank is well timed and may do good. Mr. Cruikshank, however, is wholly mistaken in thinking that no one but himself has ever thought of the absurdity involved in the apparition of ghosts of old clothes. This has long and often been urged in argument against the modern spiritualists, so far as they patronize the orthodox "ghosts," as well as, longer still, against ghost believers in general. We are persuaded, however, that ridicule will not put down the "ghosts" so effectually as science is capable of doing. Sir David Brewster explains the phenomena of ghosts as being of the nature of *images* projected on the retina from the brain, and *seen* with the eyes open or shut; and Hibbert, in his "Theory of Apparitions," had many years before broached the same idea. That this is really the general nature of such "spiritual" representations as "ghosts" was *practically proved*, so long ago as the year 1839, at Edinburgh, and also at Glasgow in 1843, by the author of the recent articles on Geometrical Symbols in the *Builder*; who then showed *how to raise such ghosts*, almost at will, by the fixture, for a time, of the eyes of susceptible persons upon almost any outward object, but especially on a mirror, or other polished surface even though not reflective.

Miscellanea.

LIGHTNING CONDUCTORS.—The Bishop's Waltham Clay Company have made a brick with a hole through a moulded portion of it, for the purpose of securing lightning conductors. The material, of which the brick is composed, appears to be of admirable quality.

WORK FOR CONVICTS.—The construction of a railroad from Dartmoor Prisons to Okehampton, there to join the projected central line of the South-Western Company, is in contemplation. The line would be about twelve miles in length, and almost a level plane. The works will be done by convict labour.

INDIGO SUPERSEDED.—At Elbœuf, in Normandy (a seat of the broadcloth manufacture), a newly-devised chemical combination has been discovered, which is said to produce a brilliant blue, less costly than indigo, if not also a faster colour. It has been brought under the cognizance of our Board of Trade, and may possibly affect a large class of interests in India.

THE SUPPLY OF WATER TO BELFAST.—The *Northern Whig* of Wednesday week says:—"Yesterday, at one o'clock, although the rain fell heavily during the morning, there was not a drop of water coming over the overfall to the basins. About 1¾-inch was passing through the 'mill-owners' slot.'"

MARRIED MEN STEADIEST.—The Guardians of the Holborn Union have been lately advertising for candidates to fill the situation of engineer at the workhouse with a single man, a wife not being allowed to reside on the premises. Twenty-one candidates presented themselves, says the *City Press*; but it was found that, as to testimonials, character, workmanship, and appearance, the best men were all married men. The guardians, therefore, elected a married man.

RESIDENCES OF CELEBRATED MEN.—With regard to the proposition that the Society of Arts should take up the matter of marking the residences of remarkable men, Mr. John Leighton states that the Board of Works, who name and number the streets, and ought to see to such records, refused permission to artists who wished to place a marble tablet on the house in which J. M. W. Turner was born and lived, in Maiden-lane, Covent Garden, and who had subscribed a sum for that purpose.

WILFUL DESTRUCTION BY BRICKMAKERS.—Last week it was ascertained that no less than from 13,000 to 14,000 bricks had been destroyed by being trampled upon during the previous night, in the brickyard belonging to Mr. John Tetlow, situate in Cow Hill-lane, Ashton. It seems that the bricks made by Mr. Tetlow have, for some time, been the work of various members of his own family only. Notwithstanding this, about two months ago, a large number of bricks were destroyed, but of which no publicity was made at the time. A fortnight ago Mr. Tetlow engaged two additional men, who, although they had applied to be admitted members of the union, for some reason or other were refused; and, Mr. Tetlow having retained them in his service, it is conjectured that he has been made to pay the penalty for so doing. The number of butts demolished is seven, which have taken upwards of three weeks' labour, the cost being 6s. 10d. per 1,000 for moulding, &c., and 1s. 6d. per 1,000 for casting the clay, to which has to be added the payment of quarterage, &c. Mr. Tetlow has offered a reward for the apprehension of the offenders.

MEETING OF THE BRITISH ARCHÆOLOGICAL ASSOCIATION IN LEEDS.—The British Archæological Association will hold its 20th anniversary in this town during the ensuing month, the proceedings being commenced on Monday, the 12th of October, and extending to the Monday following. The president of the association is Lord Houghton (late Mr. Monckton Milnes). The arrangements for the meeting devolve upon the council of the Leeds Philosophical Society, as the local committee. Papers will be read on various topics interesting to archæologists and antiquaries, and excursions will be made by the members, amongst other places to Ripon and Fountain's Abbey, Adel, Farnley, Ilkley, Harewood, Wakefield, Pontefract, Boroughbridge, Aldborough, Kirkstall Abbey, Halifax, and York, each of them presenting a wide field of attractive study. The list of papers is a good one.

ASSESSMENT OF RAILWAYS, GAS, AND WATER COMPANIES.—The recent decisions in the Court of Queen's Bench upon the subject of rating railways and other companies who either destroy rateable property or occupy land and premises beneficially, have induced several of the metropolitan parishes entirely to revise their assessments in this particular. The assessment rate and appeal committee of the parish of St. Pancras have therefore taken into consideration the subject in relation to the assessment of the London and North-Western, the Great Northern, the North London, the Midland, the Metropolitan, and the Hampstead Junction Railway now existing or in course of progress in that parish; as also the Imperial and Chartered Gas Companies, the New River and West Middlesex Water Companies, the Electric Telegraph and the London Cemetery Companies; and they find that the assessment on the rate made on the 11th of April of the present year was 63,936*l.*, a sum totally disproportionate to the amount of land and premises occupied beneficially, or of property destroyed; and they have therefore recommended to the representative vestry to increase the assessment upon these properties by a sum of 30,542*l.*, or in the aggregate to the sum of 94,478*l.* The recommendations of the report have all been adopted.

NEWINGTON BUTTS NEW VESTRY HALL.—At a vestry meeting of the parish of St. Mary, Newington, the tender of Messrs. Chinnock & Co., for the erection of a new vestry hall for the sum of 6,240*l.* was accepted. An amendment that Bath stone instead of Portland should be used, was wisely negatived by a majority of 34 to 4.

TOMB OF LEONARDO DA VINCI.—The *Gazette des Etrangers* says:—"An important discovery in the history of art has just been made. A few months back M. Arsène Houssaye was commissioned by the State to direct researches at Amboise (Indre-et-Loire), with the object of finding the tomb of Leonardo da Vinci, the position of which was unknown. Last week the pursuit was crowned with success. A sort of case, found in an old church at Amboise, and containing a coffin, was pointed out to the notice of M. Houssaye. An inscription on the lid of the coffin is said to leave no doubt of the authenticity of the remains which it contains. Thus are refuted, as was expected, the suppositions that Leonardo da Vinci had died elsewhere than at Amboise."

STRIKES IN THE NAIL TRADE.—Those men, women, and children who make the nails called "thousand nails," greatly outweighing in number any engaged in any other branch of the nail trade of the districts known as Coseley Coppice, Sedgley, Lower Gornal, Upper Gornal, Cotwall End, &c., have given notice of a strike for a rise of 10 per cent. on present prices. The makers of horse-nails have given notice for a rise of 6d. per cwt. Some masters say it is only for 3d. An advance of 6d. has been made in some quarters. At present the masters have large stocks on hand, and can wait for many weeks, unless there should come a great and sudden demand. With respect to the common nail makers it is not improbable that differences which exist will shortly be settled. In some districts the men have never left work.

CASTLE-HILL IMPROVEMENTS, NORWICH.—At an inquiry to ascertain and assess the value of a dwelling-house and premises in Golden Ball-street, required for the contemplated improvements there, an offer had been made by the corporation of 500*l.*, which had been declined. The corporation took the whole property, when they wanted only the front portion, and the purchase-moneys of the premises in the three last conveyances were 499*l.*, 525*l.*, and 600*l.*: they had also been mortgaged for 400*l.* The owners valued the property at 600*l.*; Mr. J. Grand had unsuccessfully offered 600*l.* for it; Mr. W. Browne (builder), thought it was worth 80*l.* a-year rental, and would sell for 500*l.*; Mr. D. Balls estimated its value to a willing purchaser at 600*l.*; Mr. S. W. Spelman thought the corporation ought to give 650*l.* for the property; Mr. J. Lacey and Mr. W. Warman agreed with Mr. Ball's estimate. For the corporation, Mr. Butcher and Mr. Wilde gave evidence, the former of whom considered 460*l.* a fair and liberal price, the latter 500*l.* The jury found a verdict for the plaintiffs for the full amount claimed, 600*l.*

THE LOCAL IMPROVEMENTS UNDER THE PUBLIC WORKS ACT.—The amount of loans to be applied for by the Manchester and Salford corporations is not yet formally announced, but seems to be virtually settled as follows:—Manchester, 250,000*l.*; Salford, 100,000*l.*——The committee appointed by the town council of Stockport are preparing a scheme of public works for the employment of skilled and unskilled labour in the borough, and classifying a number of suggestions for improving and draining existing streets and constructing new ones, to be submitted to the approval of the Home Secretary. The committee and surveyor have had the benefit of the advice of Mr. Rawlinson, in the selection of the works. The system of drainage to be adopted, according to the local *Advertiser*, will be of a highly-improved and scientific character. The cost of the works has been variously estimated at 50,000*l.*, 60,000*l.*, and 70,000*l.*——The Stalybridge town council have resolved to apply for a loan of 3,000*l.*, to be applied in constructing, altering, enlarging, repairing, and cleansing the common sewers, drains, culverts, and watercourses within the borough. The Health of Towns Acts will be adopted, and the council are considering what can be done as to a cemetery and waterworks.——The Ashton town council has resolved to apply for a loan of 76,000*l.*, a first instalment of 5,500*l.* immediately. It is intended to make a main trunk sewer, and to sewer, pave, flag, and otherwise complete several streets.——We understand that the entire 1,500,000*l.* provided by Parliament for sanitary works in the Manchester district, will be taken up on the terms offered, viz., 3½ per cent., to be repaid in thirty years.

BARRY'S PAINTINGS.—With reference to the steps recently taken by the Society of Arts to preserve Barry's paintings, Mr. Chas. Keene, of 18A, Orchard-street, says he has in his hands, for a similar purpose, Barry's picture, "Alexander and his Physician," which was painted expressly for Edmund Burke. It may be seen by any one who will call. It is little known.

DOCK EXTENSION AT SUNDERLAND.—An important step towards the execution of the contemplated dock extension at Sunderland has been taken. At a special meeting of the Wear commissioners, the seal of that body was affixed to a mortgage for the sum of 50,000*l.*, being the first instalment of the loan of 150,000*l.* from the Public Works Loan Commissioners. The money having now been obtained, the preliminary works will be pushed forward as speedily as possible.

THE PRINCESS'S THEATRE.—London is indebted to Mr. Walter Montgomery for a series of very well acted plays at a time when such things are scarce. The principal part in each has been played by himself, and when we mention *King John*, *Sir Giles Overreach*, *Claude Melnotte*, *John Mildmay*, and the *Duke* in "The Honey Moon," it will be seen that his scope is considerable. His personation of *Sir Giles Overreach* was a remarkably good piece of acting, discriminating and effective. He is unquestionably a great gain, and it is to be hoped that the metropolitan stage will not lose the advantage of his services. The season closes (this) Saturday night with performances for his benefit.

FOOTPATHS AT CHELSEA SUSPENSION BRIDGE.—Within the past week numbers of workmen have been engaged in making improvements at and near the Chelsea Suspension Bridge, under the direction of the Metropolitan Board of Works. The approaches to the bridge on the Middlesex side have been widened and improved, as well as those to the recently finished barracks. It was found that the footways of the bridge were defective, and on examination the wooden blocks were discovered to be in an unsound condition, and inadequate for the purpose for which they were laid down. The Board of Works decided that the blocks should be removed, and in their place the entire footways, &c., are being covered with Seyssel asphalte, by Armani & Co., of Guildhall-chambers. The works are being pushed forward with vigour.

THE LIVERPOOL SCHOOL OF SCIENCE.—Lord Stanley, M.P., presided at the prize delivery of this school of science; and before delivering the prizes, briefly stated the circumstances which attended the formation of the school, and paid a tribute to the liberality of Sir William Brown; the school having its seat in the buildings which were mainly established by Sir William. Speaking of the immediate and practical good to be derived from schools of science, Lord Stanley said the result was twofold—partly it tended to give men practically engaged in various pursuits a knowledge of the principles which they have to apply—it enabled them to work intelligently as men, and not blindly as machines; partly, also, it serves to correct a vague, loose habit of thinking, by a training more strict and severe than that of ordinary life. Even in the education of our upper classes, of those who ought to be the brain-workers, as opposed to the hand-workers of society, too much time is given to the study of the works of man, and too little to those of nature.

MONUMENTAL.—The memorial statue of the late Earl Fortescue, Lord-Lieutenant of Devonshire, has been placed on its pedestal, in the Castle-yard, Exeter. The work is in Sicilian marble, and is from the chisel of Mr. E. B. Stephens, of London, the sculptor of Sir Thomas Dyke Ackland's monument. The figure, which is nearly white, is 8 feet high, and stands upon a pedestal of the same height. The entire height of the monument is 16 feet. The base is of granite, and has been cut by Mr. Easton, of Exeter.——A monument has just been erected on the north side of the chancel of St. Michael's Church, Louth, to the memory of the late Rev. W. Wright, M.A. It consists of a canopied niche, with sculptured panel in the arch above, and a pediment terminating in a carved finial. The slab containing the inscription is of polished serpentine, with gilt letters. Mr. Fowler was the designer of the monument. ——The inhabitants of Stafford are making an effort to obtain subscriptions, to erect a memorial to their townsman, Izaak Walton, of piscatorial celebrity.——It is proposed to erect a duplicate of Foley's Dublin statue of Oliver Goldsmith in London. The statue is 7 feet 6 inches high, and was cast in bronze by Messrs. Elkington. It stands on a granite pedestal 8 feet 6 inches high.

THE NEW ALBION OUTFALL AT BRIGHTON.—The first length of the new iron outfall has been floated to the bed prepared for it below low-water mark. The length first tried was 300 feet (of 1,700 feet in all); but some fear being entertained while floating it that injury to it would result from so long a length being taken out at once, it was cut in two, and the first part has been safely floated out.

THE HARTLEY COLLIERY ACCIDENT.—In connexion with the Hartley Colliery Accident Fund, it is stated that, after making ample provision for all the widows and children who suffered from that terrible catastrophe, a sum of about 20,400*l.* remains unapplied, and that it has been agreed by those having charge of the said fund to distribute this amount in equal proportions to the twelve mining districts of England, Wales, and Scotland.

INJURY TO THE HÔTEL DE VILLE, BRUSSELS, BY LIGHTNING.—During a recent thunderstorm a flash of lightning struck the spire of the Hôtel de Ville of Brussels, and broke one of the turrets of St. Michael's tower into hundreds of pieces. The *débris* fell into the court of the Hôtel de Ville, and upon the Grand Place. No person was hurt. This is the third time within the last few years that the Hôtel de Ville has been struck by lightning. The expense of the restoration of the building is estimated by the engineer of the city at 10,000fr.

OPENING OF THE BAXTER PARK, DUNDEE.—As previously announced, this park has been inaugurated with great ceremonial, and formally handed over by Sir David Baxter to the trustees for its conservation. The day was held as a complete holiday. Earl Russell was present, and received the freedom of the town. The park occupies the space of 38 acres, and is said to be tastefully laid out. In the centre stands a pavilion, in the Italian style, built at a cost of 6,000*l.* The cost of the park, its embellishments, and the sum set apart by the donor for its maintenance, cannot be less than 50,000*l.*

LIVERPOOL INSTITUTION OF FINE ARTS.—The first exhibition held under the auspices of this new body has been opened to the public in Old Post-office-place. If the value of the Institution is to be judged by the number of works of art which have been brought together, its importance, according to a local paper, has been established. The collection is large and varied, twelve hundred and forty-one works being shown in the rooms, which are very much crowded, and even the staircase is filled. The collection includes specimens of the productions of favourite artists of the day, both British and foreign, and many works have been excluded from want of space for exhibiting them. At the private view on Saturday last, notwithstanding the unfavourable nature of the weather, the galleries were crowded by an assemblage of ladies and gentlemen of the first position and influence in the town.

RAILWAY MATTERS.—The traffic receipts of railways in the United Kingdom amounted, for the week ending the 29th of August, on 10,882 miles, to 641,770*l.*, and for the corresponding week of last year, on 10,428 miles, to 637,615*l.*, showing an increase of 454 miles, and of 4,155*l.* in the receipts.——The Bristol and South Wales Union Railway has been opened for public traffic. The carriages placed on the line are those lately released from the Metropolitan Railway. There is a good deal yet to be done on the Welsh side, but the work is being pushed on. A station will be soon erected at the Portskewet Junction. The line will be of advantage to Bristol and neighbourhood.——The Rev. W. R. Bowditch, of Wakefield, is said to have discovered a process by which railway carriages can be illuminated cheaply and simply with a bright and steady light. By the application of Mr. Bowditch's apparatus each foot of gas is said to give 5¼ times as much light as given under ordinary circumstances. As described, the process seems merely to be one of those in which gas is impregnated with hydro-carbonic vapours. The gas, before being burnt, is passed through an air-tight box, containing hydrocarbons of high density. These are heated by the burning gas, and so are volatilised in the box. The gas, in its passage through the box, carries with it a part of the vapour, the carbon of which renders the gas highly illuminating. The hydrocarbons cost about 1d. a pound, and about 1½ lb. is sufficient for two lights for a week. The apparatus is at work in one of the lamps at the Wakefield railway station, and the light from it is said to be brighter than that from the lamps adjoining. We understand that the invention is being tried on some of the principal railways.

GOVERNMENT SCIENCE SCHOOLS AND CLASSES, 1863.—The total number of individuals under instruction in 1863 was 3,811, and in 1862, 3,413: of these 869 were in uncertificated classes last year, and about 700 this, making the increase in students in certificated classes between May, 1862, and May, 1863, 566. The total number of individual candidates who applied for examination in 1863 was 2,000, and in 1862, 1,708.

NEW WATER-WORKS FOR BRECON.—At a recent meeting of the Brecon local Board of Health, a report having been read, it was agreed that it was necessary to have a sufficient supply of pure and wholesome water for the inhabitants of the town, and that such supply of water be confined, preferably, if not absolutely, to the source at Rhydgoch, on or near the spot indicated by the town surveyor. It appears that the estimated cost of the works does not exceed the sum of 4,600*l.* Mr. Isaac Davies was appointed surveyor and engineer, at a salary of 125*l.*, with the use of Mr. Bert's map, plans, &c., of the borough.

TENDERS.

For draining a part of the Roath district, to join the Cardiff sewer. Mr. John Williams, surveyor:—

James & Price	£728 0 0
John	669 0 0
Ayres	600 0 0
Francis	559 0 0
Watkins	515 0 0
Moore	499 0 0
Gibbs	490 0 0
Price	485 0 0
Turner	469 0 0
Thomas (accepted)	460 0 0

For St. Ann's Church, Nottingham. Mr. R. Clarke, architect:—

Ward, Ansell, & Co.	£2,860 0 0
Willemott	2,852 0 0
Acton	2,550 0 0
Demett & Co.	2,549 0 0
Wright	2,493 0 0
Haw & Wooll (accepted)	2,487 0 0

For alterations and additions to house and premises at Toft, near Bourne, Lincolnshire. Mr. R. W. Johnson, architect:—

Taylor & Hobson	£1,230 0 0
Bradshaw	1,195 0 0

For farm buildings, Cross Oaks, Shenley, Herts, for Mr. Richard Durant. Mr. Thomas Hill, architect:—

Ladds	£797 0 0
Mashman	797 0 0
Bottom	705 0 0
Young	688 0 0
Miller	661 0 0

Accepted tenders for Pontefract workhouse. Messrs. Lockwood & Mawson, architects:—

Brickwork, and Carpenter and Joiner's Work.

Neill	£3,935 0 0

Mason's Work.

Widdop	£1,034 17 0

Plumber's Work.

Stead	£419 0 0

Ironfounder's Work.

Benett	£325 0 0

Plasterer's Work.

Driver	£289 0 0

Slater's Work.

Hill	£295 0 0

Painter's Work.

Butler	£156 0 0

For additions, &c., to Hawthorn dene, Bonchurch, Isle of Wight, for the Rev. E. Venables. Mr. Francis Newman, of Ryde, architect. Quantities supplied:—

Spary	£481 15 0
Beavis & Son	480 17 0
Day	458 0 0

For the erection of a shop, with warerooms, dwelling-house, &c., in Union-street, Ryde, for Mr. J. E. Scott, upholsterer. Mr. Francis Newman, architect. Quantities supplied:—

Langdon	£2,171 0 0
Meade	2,163 0 0
Colenutt	1,854 0 0
Denham	1,750 0 0
Sibley	1,720 0 0

For alterations and repairs to mansion at Pentre, Cardiganshire, for Mr. A. H. Saunders Davis. Mr. St. Aubyn, architect. Quantities supplied by Messrs. J. C. & G. Lansdown:—

Dimont	£6,647 0 0
Patman & Co.	5,740 0 0
Estcourt	5,655 0 0
Pollard	4,998 0 0
Williams	4,850 0 0
Lewis	4,747 0 0

For the first portion of a new mission house at Rock Ferry, for the Rev. Charles Jolivet. Mr. E. W. Pugin, architect. Quantities supplied by Mr. S. Marples:—

Simpson & Malone	£3,729 0 0
Roberts & Robinson	3,697 0 0
Smith & Son	3,300 0 0
Baynes	3,300 0 0
Farrel	3,297 0 0
Hogarth	3,250 0 0
Watkins	3,050 0 0
Glaister	3,040 0 0